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BIOLOGY

Grade 1 Secondary
Student Book

2019 - 2020

غير مصرح بتداول هذا الكتاب خارج وزارة التربية والتعليم والتعليم الغني

Book cover



Expresses the human blood cells

BIOLOGY

Grade 1 Secondary

Student Book

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2019 - 2020



Center For Curriculum & Instructional Materials Development

مقدمة الكتاب

أبناه الوياتنا طلاب الصف الأول الثانري ، شهدت الأعوام الأخيرة طفرات هائلة ومستحدثات تكنولوجية في شتى مجالات الحياة ، وكان على المنظومة التعليمية بجمهورية مصر العربية أن تواكب هذه المستحدثات متأثرة بهذا النطور الهائل.

لذلك حرصت وزارة التربية والتعليم على تطوير المناهج على اعتبار أن المنهج كانن يلزمه التجنيد والتحديث ليتوافق مع متغيرات العصر وذلك بهدف إعداد جيل قادر على مواكبة هذه المستحدثات ، بل تكون له القدرة على استخدامها في ابتكار ما هو أحدث.

وقد راعينا في إعداد هذا الكتاب تغيير دور المنعلم لنخرج به من حيز المتلقى إلى مجال المتفاعل النشط من حلال قيامه بالبحث والاستقصاء والمقارنة والاستنباط واكتساب المهارات وغرس حب المعرفة حتى يصبح فردًا فعالًا في المجتمع دوذلك لتحقيق الاكتفاء الذاتي لوطنه اقتصاديًا وتقافيًا واجتماعيًا ، رذلك من خلال النفرع في الأنشطة والمهارات بهدف إعداد جيل منتوع من الطلاب يخدم الوطن في كافة المجالات .

ويتضمن الكتاب أنشطة فردية وجماعية ، معملية وتطبيقية لتحقيق أهداف المنهج . وينتهى كل فصل بأنشطة تقويمية حتى يقف الطالب على ما تحقق من أهداف وما بجب القيام به من أعمال لتحقيق ما لم يتم تحقيقه - وقد راعينا في إعداد هذا الكتاب التسلسل المنطقى لأبواب المنهج ، وكذلك التدرج في مسترى هذه الأنشطة مراعاة للقروق الفردية والحاجات والمبول المختلفة .

وقد تم عرض هذا المتهج في شكل نسيج متكامل ومترابط في سنة أبواب تبدأ بعلم الكيمياء وطبيت وعلاقه بالعلوم الأعرى، وعاصة العديث منها مثل : علم الثانو تكنولوجي، ثم توالت أبواب المنهج مرورًا بالكيمياء الكمية ثم المحاليل والأحماض والقواعد، بليها الكيمياء الحرارية ، ثم الكيمياء الووية.

وقدتم تزويد الكتاب بروابط على بنك الدمرقة المصرى

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منها ما هو في سباق الموضوعات ، ومنها ما هو إثرائي لتعميل المعرفة والفهم نشجيعًا لكم على المزيد من البحث والاطلاع.

و تحن إذ نقدم هذا الكتاب لكم نتمتى أن يحقق ما تصبر إليه رغباتكم ويشبع مبولكم ويلبي احتياجاتكم، متمنين أن بتحقق لمصرفا الغالبة الرخاء والإزدهار.

والله ولى التوقيق،

المعدون

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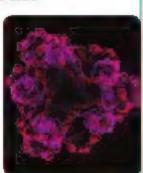
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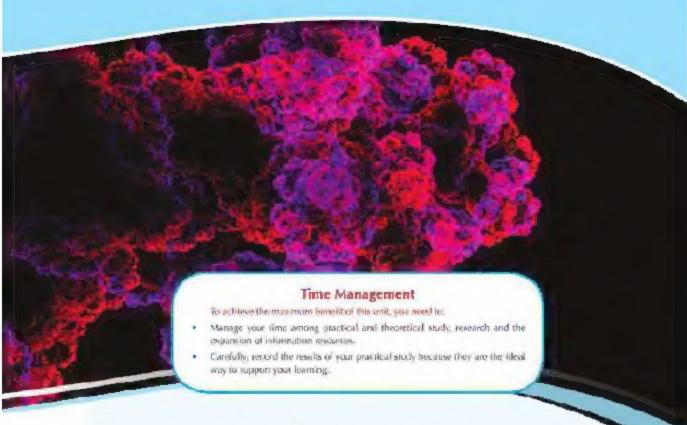
Unitions Chemical Basis of Life

Slology is closely related to chemistry. Chemistry explains the chemical structure of living organisms and the reactions taking place inside their cells.

There are four basic types of organic molecules necessary to the life of living organisms. These molecules are carbohydrates, proteins, lipids, and nucleic acids. All living organisms are made up of these four molecules. These four molecules are called the biological macromolecules.

In this unit, you will identify the molecular structure, functions and importance of these molecules to the living organisms. Furthermore, you will identify the chemical processes related to the functions of life.

In this unit, you will practise some practical and applied activities that help you to understand the nature, structure, and functions of the brological macromotecules and the chemical reactions which occur inside the cells. These activities improve some of your skills such as observations, experimentation, measurement, conclusion, interpretation, controlling the variables and so on.



Learning Outcomes

By the end of this unit, the student should be able to:

- Determine the substances from which the living a organized body are made up of.
- Describe the molecular structure of carbohydrates, a ligade, proteins, and excited across.
- Determine the functions of carlady-deciss, lipids, a proteins, and ructeic acids.
- Explain the role of monoconclusives to the processes of transferring energy inside the cells of living organisms.
- Explain the relationship among the sequence of arrive wilds in the polypopulde chains, and the structure and parsation of the proteins.
- · Identify cultohydrates, lipids, and proteins practically.

- Determine what is meant by osetaborism in living organisms a stable lean and are declising.
- Determine what is execut by engines and mechanisms and preciples of their functions.
- Explore the effect of the perion the enzymes activity.
- Charty the effect of temperature on the masyme activity precipally.
- Appreciate the grandour of Allah for the accurate structure of living organisms' bodies.

Chapter 3: Chemical structure of living organisms' bodies(proteins and nucleic acids)

Chapter 3: Chemical reactions in living organisms' bodies

Chapter 3: Chemical reactions in living organisms' bodies

Chapter 3: Chemical reactions in living organisms' bodies

Unit One

Chapter 1

Chemical Structure of Living Organism's Bodies

(Carbohydrates and Lipids)

By the end of this chapter, you should be able to:

- Description the substances from which the fiving organism's body is made up of.
- Discribe the molecular structure of carbuhydrates and lipids
- Queezolog the functions of carbohydrates and lipids.
- Explain the rule of reconstructionides as the processes of transferring the energy inside the cells of living organisms.
- Identify carbohydrates and lipids practically
- Propose scientific hypotheses and doexperiments to surely their validity.

Terms:

- Carbohydrares
- Munyopakharides
- Discolarition
- Potosunchuzidos
- Lipids

You know that the structure of living organisms comes in gradual levels. These levels begin with the systems, organs, fissues, cells and finally come the organelles.

If we follow up this structural sequence of living organisms, we will find that the cells of any living organism are made up of organic and inorganic molecules and each of these molecules is made up of atoms as well.

Inorganic molecules in living organisms such as water and salts often do not contain carbon atoms. While organic molecules such as carbohydrates, lipids, proteins, and nucleic acids are large molecules containing carbon and hydrogen, and called biological macromolecules.

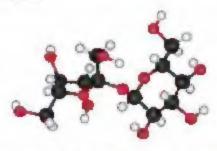
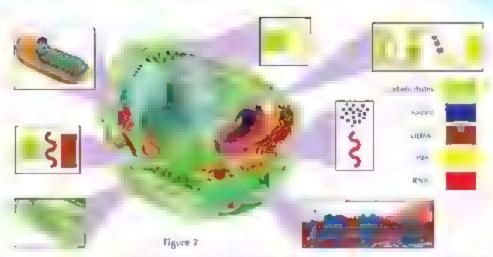


Figure 1: Sucrate malecule is one of the biological macromolecules.

Use the colour key attached to figure 2 to stentily the cell organicles that made up of:

(Carbohydrates-lipids - proteins - and nucleic acids).



Observe figure 3 to see that carbohydrates, upids, increms, and nucleic acids are made up of cores it as brack is made up of solar les upits, identify the units from which all the toil blodings is made impleciales tradity drates provens up its, and nucleic acids) are made up of.

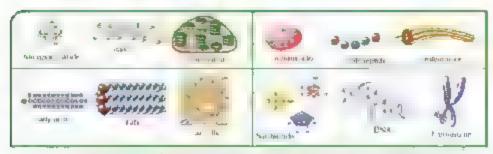


Figure 3. The units from which the four two ogics imacromolecules are made up of

Biological macromolecules

Biological macromolecules are large sized organ compounds made up of smaller molecules. All these compounds contain the carbon element and they are extremely necessary for the life of living organisms.

Most biological macromolecules are called polymers. Polymers are made up of the combination of smaller molecules called monomers throughout a process called polymerization.

Enrichment

Binchemistry is the science concurring with a plying the chemistry of living organisms.

Biological macromolecules are divided into four groups according to their molecular structures and the functions they perform.

Carbolivdrates

Carbonizorates ale biological incrumolecules made up of smaller morecules called monomers. Carbonizorates include sugars, starches and fibres. They are symposted by the formula. CHIO. According to it is formula, carbonizorates are made up of carboni (C), hydrogen (H) and oxygen (O) atoms in the ratio 1.2:1.

Importance of Carbohydrates.

- Carbohydrates and obtaining energy: Carbohydrates are considered the last and basic resources for obtaining the energy.
- * Carbohydrates and storing energy: Carbohydrates are used for storing energy in its inglorganisms, budies anti-they require it. Plants store carbohydrates in the form of starches. On the other hand, the carbohydrates are stored in the human body and animal's body in the form of glycogen in the liver and muscles.
- # Carbohydrates and building the cells: Carbohydrates are a basic component tor some parts or the cell such as cellulose in the root of planticells. Additionally carbohydrates are also found in cell membranes and in the protoplasm of the cell.

Molecular structure of earbobydrates.

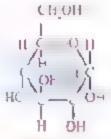
There are several ways to classify carbohydrates. Some of these classifications are based on the molecular similare or these larbohydrates. They call be it yieled into

Simple ougars

+ h's chemical composition is made up of either one of sugar molecules and called monosaccharides or made up of two mulecules of monosaccharides linked together to form a molecule of disaccharidase.

Monosaccharides

Monosacchandes are the simplest type of sugars. They are made only up of one molecule. This molecule is made up of a chain or carbon atoms. Each carbon atom is connected to except and hydrogen atoms in a certain way. The number of carbon atoms in monosacchandes ranges from 3-6 atoms.



e in all Calif. se is one Efficientes series (observation only).

Examples for monosacchandes are glucose trigue, fructose, galactose, and ribose.

Disaccharidase

* Two monosacchandes morecules are linked to each other to form a disacchange molecule. Examples for disachandase are sucrose which is made up of a glucose molecule linked to a fructose molecule liactose which is made up of a glucose molecule and a galactose molecule and maltose which is made up of two glucose molecules.



Figure 5: Secrees is one of disarchandes (observation only).

In general, simple sugars are soluble in water, have a low endecular weight and have a sweet taste.

Role of monosaccharides in the processes of transferring energy inside the cells of living organisms.

Living organisms obtain energy stored in carbohydrates when the glucose molecules are oxidised inside the collis in tochondon and the energy stored in its chemical bonds released in the form of a compound called adenosine triphosphate (ATP). This compound is transferred into other places in the delicities the stored energy in it for all the vital processes inside the delicit.

Second Complex rogani

Complex sugars are polysarcharides made up of monosaccharides such as starch or laiose and glycogen. Each of them is made up of glicose molecules combined with each other. Complex sugars are insoluble in water, have high molecular weight, and do not have sweet taste.

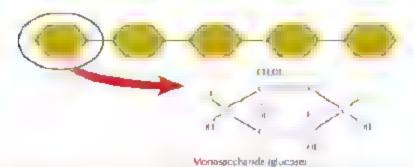


Figure & Complex sugges are made up of several monosacchandes (glucose) (observation only

Lipids

I picts are biological macromolecules made up of carbon, hydrogen and oxygen aborts in juds are also made up of a large group of interogeneous compounds such as at sixts waxes, hospitable its at 1 the derived lights socials stemarts. At these compounds are not table to water but hey dissolve in the compolar solvents such as benzene and carbon retrachlor de

Molecular structure of lipids

Observe figure 7 to see that the lipids are made up of fatty acids, and giycerol. Glycerol is an alcohol containing three hydroxyl groups (OH).

Importance of lipius

Lipids and obtaining energy

However, carbohydrates are a rapid resource of energy, the energy obtained from lipids is more than the energy obtained from the same amount of carbohydrates. If elbody does not begin to get the energy from the fats stored in it, only in case of the absence of carbohydrates.

H ← C ← O ← Al y AL y ← O ← Al y AL y

Eigure 7° A diagram illustrating the proton aut sent time it much foliaservation only?

Upids and building the cells

Lipids represent about 5% of the organic materials involved in the composition of the diving cell. Lipids also have an important role in the structure of cel membranes.

Furthermore, pids work as a thermal insulator in animals and humans. Due to the rayour of lipids organisms can maintain their temperatures in severe color regions. Besides, I pids can work as a projective cover for the surfaces of Several plants and animals, and some of them can work as hormones as steroids.



aguste of injustitions in out and laters under the skip

Classification of lipids

According to the chemical structure, lipids are classified into

Simple lipids

Simple includes are increased by the reaction of arty acids with alcohols. According to the saturation degree of the tarry acids and the type of a control stropped picts are divided into:

O15

Oils are liquid fats formed by the reaction of unsaturated fatty acids with glyceroi. Examples for simple lipids are the liquid fats covering the feathers of water birds to prevent water penetration into their bordses, figure 9).



Figure 9. Fearhers of water birds

ollo Fats

Fats differ to an cols — the aspect of the ing solid substances. Futs are turned by the reaction of the saturated fatty acids with glycerol.

c Wates

Waxes are made up by the reaction of tarty acids of high morecular weigh with mone spiric alcohols. For example, the waxes covering the desert plant leaves to reduce water loss during the transpiration.

Enrichment

Risks of the takeaway food

Ready meals, fired food, and many bakeries and sweets contain a type of at caller trans at that impace by hydrogena on of engetable oils. Errogenative eating of these art work in elevation or cholesterol corner dation in broad.



figure of the wax covering the plant saves

* Complex lipids

Hydrogen, carbon and oxygen are involved in the structure of complex inida in addition to phosphorus and nitrogen as in phospholipids.

Phospholipids:

They are present in cell membranes of animals and plants. They are similal to fat molecules in the structure except for the prospirate group PO — and choline which replaces the third fatty acid (figure 11).

Derivative lipids:

They are included from both the simple and crimp exclipitfs by bythrolysis such as cholesterol and some hormones.

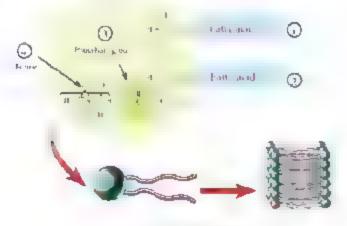


Figure 13, Phosphat pear spherostion angli

Activities and Excersises

Chapter 1

Chemical structure of living organisms bodies

Practical activity



Detection of sugar

Share your group in this activity.

Safety precautions





Activity goal

Reveal he presence of surprimit different fault samples using the base flemedict's respect thems orange or presents at simple suggest glosses

Acquired skills

Physothesisting, apperimenting, concluding, observing, exterpreting

Materials needed

Water halfs, harrier, if the station, tube rock, glussier solution, stock solution, egg albumin, distilled water, Benglich's esagent, part, tube natelle.



Hypothesizing

in light of the goal of this activity, which substance (s)

you have contain a monosaccharide (glucose, ?

- Test he validity of your hypothesis:
- Tabel test aubes 1 4.
- Put 2 ml of glucose solution, starch solution, egg albumin, and distilled water, respectively in the rubes
- Add 2 mi Bened ct's reagent to each tube.
- Leave the tubes in water bath for 5 minutes

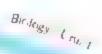




- Which tube (s. give positive results (turns to grange) and which is negative colour is not changed)?
- What is the relation of your results with your hypotheses?
- What do you conclude from the experiment?
- Does the starch colour change by adding Benedict's reagent? Why?
- Which of the previous substances must be avoided by diabetic and obese pacients?
- How can denedict's reagent be used in the different situations of actual life?



July II.	Stronger r	The lampates
2	Starch is literary	466
3	Face Districted	
4	Jesilled water	







Detecting the starch

Sefety precaution



Activity goal

 Isovouski a detecting the Tesenie of starch in some foods you are tasting by using ordine sofution (todine turns blue in presence of starch.

Acquired skills

Experiencing, observing, intering, explaining, classifying

Materials needed

Samples of mode Mills possible, per seeds, sectorary grains, surrous sugar, green apple, tensations arrots, defens discretic, arrots, before educion and a dropper.

Support your opinion with the results of the experiment her do a report to show your classmates

Procedure:

By using rodine solution, detect the presence of starch in samples you have

Note Some materials such as Soybeans macazoni and wheat needs grinding.

Observation:

Design a table to write down the change in rodine colour in each case



Classifying

In a table, classify the foods you tested into 2 categories according to their content of starch

rantical activity

Detecting lipids

Safety precautions



Activity goal

effect or presence of by dick deterrat samples or north pengoblider older a) imagent C - oplane in talk and turns rid in prosence of #IBTE

Acquired skills

Mypothesizing, experimenting, affag, Joseph org., q. annog

Materials needed

Society-4 stain, potatoes, boso weeks agracion to alcular began- shados apliasan apper morta. and 4 test tubes

Participate your group in this activity.

Procedure: -

Hypothesizing

in light of this activity goal, which substance (5) you have contain i pids?

Test the variety of your hypothesis:

 Cut a small piese of potato, then cut it into smaller. pieces. Put the pieces in a mortor and grind. If you need, you can add 2ml of distried water to facilitate grinding. Collect the resulted luice in a test tube and label potato juice

Using another mortar, grind bean seeds, and repeat the previous step with peanut seeds. You can add 2 mill dishilled water for each

in a test tube, but 2 million what resulted from bean seeds grinding. In another tube, put 2ml of what resulted from peanut seeds granding. In a third tube put 2ml distilled water.

Add 2ml of sudan -4 stam to each tube.

Write down your abservations in the table:

Conclusion:

- Which substance (s) tested contain fats? What is the relation of your results with your hypothesis?
- How can sudan 4 indicator be used in the actual life. situations?

No	Sols and	The assided
1	Potato	
2	Bean seefs	
3	Peanut seeds	
4	Distilled water	



Unit One Chapter 2

Chemical Structure of Erving Organism's

Bodies, (Broteins, and Nucleic, Acids),



By the end of this chapter, you should be able to:

- Describe the replectular structure to:
 -oth proteins and runchic acids
- Mermine he iunchors or both protons ng speciale ands
- Explain the relationship between the sequence of artino acids in the polysophir chains and the composition of proteins unditheir variation.
- Identity be primary, secondary natury and qualernary structure of proteins
- Identify proteins practically
- Perpense emetrific hapatheuse and risenprensentalist early their validity

Terms

- "typically
- Arrilano de Isla.
- Polypeptide
- On many streeture.
- Secondary structure
- Fortury structure
 Jacomore a symmetry
- WL 41-10 5
- Nurleetder

Proteins

Proteins represent the structural composion of all lising organisms. All living organisms from the hugest animal to the extremely microscopic one are mainly made up of proteins. Proteins contribute to the brochemical processes preserving the life.

Importance of proteins

Proteins are involved in the structure and functions of the living cells. They are one of the basic components of cellular membranes, in addition proteins form the muscles, ligaments, tendens, organs, glands, nails, hair and a lot of the vital fluids of the body such as blood and the lymph. They are necessary for bone growth. Furthermore, enzymes and hormones which stimulate and regulate all the vital processes in the body are proteins. Proteins are a basic component of chromosomes.



Figure 12: Spirite's not house, and homs of animals are basically marie up of proteins

Motecular structure of proteins

Proteins are Complex macromolecules (polymers). They have high molecular weight and made up of structural units (monomers) which are am no acids.



Ligure 13: A model illustrating the composition of proteins and amino acids

Am no acids

Amino acids are the proteins building units. They are organic compounds made up of hydrogen, oxygen, cathon and nitrogen atoms. Observe figure 14 to see that amino acids are made up of a basic group- the amino group NH₂, an acidic group- carboxyl group COOH. Those two groups are the functional groups in the amino acid, a hydrogen atom and a terminal group R which differs from an amino acid to another.



Figure 14: Constal formula of an amino acid

Anuses acids and building of protein

Proteins are made up of repeated units of amilia acids which link with each other by peptide bonds. Observe (figure 15. You can observe that these bonds are irresent between the carboxyligidup of an amino acid with an amino group of another amino acid, with the removal of water due to this combination.

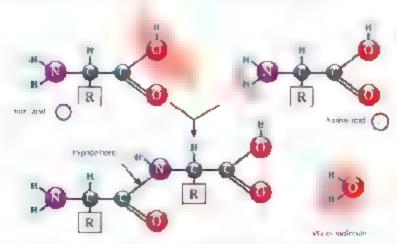


Figure 5:Amino acids we instead together by neptide hands lobservation only)

The product of combination of two amino acids is called dipeptide compound and the protein chain formed of severatiam i placifis is called polypeutice. When protein is being formed it is not conditional for the combination to occur among similar amino holds. This gives extensively with and various possibilities to torm profesies depending on types order and natiber of anino acids in the chair. About 20

amino acids participate in building the profess such as glycane alanine and value.

Deputy of the physical



Proteins are classified according to the substances

Simple proteins

Classification of proteins

involved in their structure into:

Simple proteins are made up of the pasic upds of autiding protein. It of amino acids only such as a burning present on the leaves and roots of plants and in blood plasma of humans.

Conjugated proteins

Conjugated prote is are leade up or amino accesassociated with other elements such as phosphorus. lodine and Iron Besides, the nucleic proteins associated with the nucleic acids and phosphoproteins. such as casein-the misk protein, which contains phosphorus. The Civilial profe i discrete which contains odine while the haemographic contains from

Nucleic acids

Nuciele acids are biological macromolecules containing oxygen, hydrogen, carbon, nitrogen and

Log In the internet to identify the rest of amino acids involved in building the proteins. Claserye and determine the type of R group in each amino acid.

The ack of alfatta in in the body leads a in his ance. in comotic pressure of the cell. Also, the body retains a size a poer of lugis which cours swelling especially to the way the little by the little was add the prevents the reaking of flinds from blood vessels Into the tissues. So, album'n maintains the comptic pressure inside the cell.

Enrichtment

phosphorus. There are two types of nucleic acids. Ribonuc eic acid. RNA, and Deport bon, that at all DNA) Not are are state made up to haster its called nucleofices which bind logether by covalent golds to form a polynocitotide or the nucleic acid

Netelephoes

Nucleotides are the basic units forming the nucleic acid. Each of them is composed of three units il lustrated in figure 16.

- A peniose sugar molecule: There are two based types of sugar to nucleic a cids.
 - first type: Deoxyribose sugar involved in the composition of DNA.
 - Second type. Ribose sugar involved in the composition of RNA.

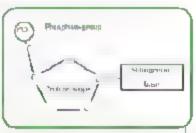


Figure 16: Composition of a nucleotide

* A phosphate group

It is connected to the carbon atom number 5 of the sugar molecule.

A nitrogenous base

Nitrogenous bases are: aden ne (A), guarante (C) cytosine (C), thymine (T) in a DNA molecule and uracit. Us shound in PNA molecule instead of thyraine care is found in RNA only instead of Thymine in DNA. Each base is connected to the carbon arom not bor soft the sugar molecule. Nucleic acids differs with respect to the difference of type of pentose sugar and the rifl ogenous bases for ring them.

4

Check your skills:

Observe figure 17 and compare the nitrogenous bases of both DNA and RNA.

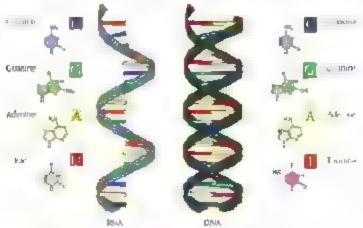


Figure 17. The molecular structure of DNA and RNA

Importance of nucleic acids

In plett acids are carried on the chromosomes inside the cell nucleus. They are responsible for passing on the genetic traits from a generation to another when cells divide. DNA cames the genetic Information responsible for appearing the distinctive characteristics of the living organism and organize all the vital activities of the cell.

On the other hand, RNA is transcribed from the nucleic acid DNA, then it transfers into he cytopiasm to be used by the cell to synthesize the proteins responsible for appearing the genetic traits, and those responsible for organizing the vital activities.

Enrichment

Bio computer

to Beta of nancrecthoology, scientists arrived to that DNA can be ased to make biochips and using them to make computers much faster than current devices that rely on stheon chips. Also, their storage capacity will be millions of times greater than current devices.

Activities and Excersises

Chapter 2 Chemical structure of fiving organisms budies (proteins and nucleic sculs)

reflect materity Detection of proteins Procedure. Safety precautions Predict which substance is you have contain protein? Label test tubes 1 - 4. Activity goal AMARY THE RESPONDED graph 2 more egg albumic socion, stands esting three deeps when these his violet o desence if its burn solution, sucrose solution and distribed water, respectively, in the 4 tubes Acquired skills Prodicting (entiremphy) Add 2ml b uret reagent to each tube. observing, explaining materials needed Bistori ovagent, egg albumin .. Substance. Observation Warch adultion, sociose solu on, distilled water, and 4 test robes. Egg allaumin Starch solution 7 3 Sucrose solution Distinct water 4

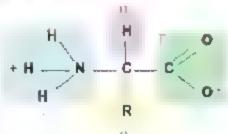
me Record your observations in the table above:

Conclusion and analysis.

- Which substance (s) gave positive results? Which is negative?
- Compare between your observations and predictions.
- What do you conclude from this experiment?
- What are the actual life situations in which burst reagent can be used?

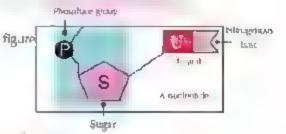
Assessment activity

- The kastowing figure represents the general sormula of informological Examine he figure, then answer the following questions:
- Identify what the numbers 1-4 represent.
- What are the numbers that represent the function (i) gloups at the function and
- Which of the previous is differ from an amino acid to another?



- The nucleotide in opposite figure represents the building unit of:
- a DNA
- b-RNA
- c- DNA and RNA

Justify your answer



Use the following table to compare between DNA and RNA :

Comparison points	DNA	RNA
Type of sight		
No. of strends		
Nitrogenous basés		
apportunce.		
Site		

Unit One

Chapter 3

ChemicaltReactions in Organisms Bodies

By the end of the chapter, you should be able to

- प्रत्यक्तिक प्रदेश के प्रयुक्ति के प्रदर्शनाविकता
 प्रत्यक के के अपने के प्रत्यक्तिक के अपने के प्रत्यक के
- dentity to had any expant to leaz mass the proper the left type master as been action.
- Explains the effect of hydrogen ion conversation of on the enzyment admits.
- Show the effect of temperature on the financial ty-
- Charity this guardent of Allah in the at their years have at the groupersons in the

Terms

- Who distincted
- discreptions:
- shareninn
- e egymes
- jest • jestense je

Brochemical reactions necessary for growth, nepalling damaged tissues and abraming energy take place null living organisms' bodies. These reactions are called metabolism and they continue in all living organisms. If they stop working, his leads to death of the organisms.

Metabolism

Metabolism is a group of brochemical processes take place inside the cell. In these processes, complex and macromolecules are being built from simple molecules and called anabolism. On the other hand, some molecules get broken down to extract chemical energy stored in it and called catabolism.

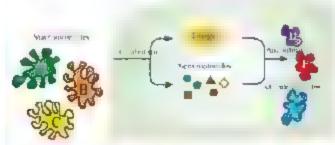


Figure 18: A diagram fluoritating catabolism and anabulism

First: Catabolism

Catabolism is the process of releasing energy stored in the chemical bonds present in the molecules such as glucose.

Second: Anabolism

In the process of anabousm's imple molecules are used to built up more complex. substances throughout a chain of reactions. These reactions consume energy such as synthesis of proteins from the amino acids.

Enzymes

All the reactions occurring in laving organisms require high activation energy to take place. To reduce the cell consumption to more energy, there should be a catalyst to be sure that the chemical reaction occurs rapidly throughout reducing the activation energy. This catalyst is the enzymes.

At itsel on energy____ The might in aburry merchan a correct on a chemica reaction to arreste.

Figure 19 illustrates the consumption of a biochemical reaction to the energy in the presence and absence of the enzyme

 Compare the activation energy of the reaction in the presence and absence of the enzyme.

Enzymes are biological datalysts. made up of large protein molecules. They speed up the

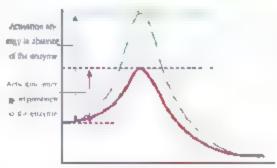


Figure 19: Effect of enzymes on the energy consumed in the reaction

changes, reactions abode the cel. The enzyme is made up of a combination of a great number of amino acids forming a chain or more of polypeptide between each other

Properties of the enzyme

- Enzymes are similar to the other chemical catalysts. They participate in the reaction without getting affected. In other words, they speed up the chemical reactions inside the cells without getting consumed
- Enzymes are affected by the hydrogen icip concentration pH and the temperature
- Enzymes are highly specific than of ierical alysis. Each enzyme is special zed. for one reactant substance. This reactant substance is called substrate, and it. is specialized for one type of reaction or few reactions.
- Enzymes lower the activation energy required to get the reaction's arted

Factors affecting the enzymes action

There are several factors that affect the speed of enzymes action such as: concentration of the entyme, concentration of substrate, temperature, hydrogen non-concentration (pH), and the presence of inhibitors.

The tollowing is an illustration to the effect of some of these factors on the speed of enzyme action

"The relationship between temperature and enzymes activity

Figure 20 illustrates the relationship between the activity of two enzymes and temperature. Observe the figure and identify the following:

- The temperature at which each enzyme starts its activity.
- The temperature at which the maximum activity of each enzyme appears.
- The temperature at which the activity of each enzyme gets stopped.
- The thermal range of each enzyme's activity

The protein waste of the cozymes makes them extremely so sitive to the hermal changes. Enzymes activity, is determined in a narrow, large of territorial irescomparatively to the ordinary themical reactions. As you have observed leading enzyme has a certain temperature at which the enzyme is more active. This point is called the optimal temperature which ranges between 37 to 400°

The enzyme activity gradually lowers, as the tempera use raises more than the optimal temperature un untreaches a cerram temperature

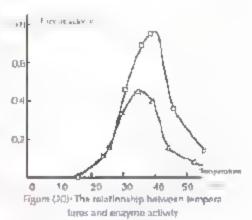
at which he enzy nelucivity stops completely oce to the change of its natural composition.

On the other hand, it the temperature lowers below the optimal temperature, the enzyme activity lowers until the enzyme reaches a minimum temperature at which the enzyme activity is the least. The enzyme activity stops completely at 0 C*, but in case of raising the temperature, the enzyme gets reactivated once more

1 de application

l'emperature degrees are sometimes recorded on some retargents to so them property

How can you explain this in the light or your's adv about the properties of EDZYMOS?



Power of hydrogen pff)

Potential of hydrogen pH is the best measurement determining the concentration of hydrogen ion H' in the solution. It also determines whether the liquid is actidic, basic or neutra. Generally, all the liquids of pH above 7 are called actids whereas the liquids of pH above 7 are called bases or a kalines. While the liquids of pH 7 is neutral and it equals the actidity of pure water at 25 C°.

Improving the skillsact appearment to show
the effect of lowering
the imperature or the
enzyme focion 0 C*) on
its activity

You can determine pH of any solution using the pH indicators (figure 21)



Figure 3 Relationship of pH with the nature of the solution

- pH and the enzymes activity

You know that the enzymes are protein substances. They contain acidic carboxy c groups COOH, and basic antino groups NH So, the enzy less are affected by the changing of pH value.

Each enzyme has a pH value working at a with a maximum efficiency called the optimal pH. If the pH is lower or higher has its optimal pH, the enzyme activity decreased until it stops working. For example, pepsia works at low pH i.e, it is highly acidic while tryps a works at high pH i.e, it is basic. Most enzymes work at neutral pH 2.4.

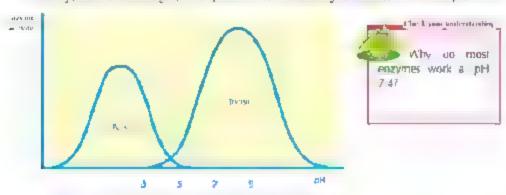


Figure 22. The options ipH values for papers and invisor enzymes.



For more knowledge about this topic you can refer to the Egyptien Knowledge Bank (EKB) through the opposite link



Science Technology and Society

Nanuluc pharmaceut wals

Protetos have several vital mies in the human body. The ability of protetos to heat a lot or discases and disorders has been discovered. These bix oglea marromoler des revelbeer known as hurpharmar europes. It is extremely difficult to carry on the medicine directly to the target parts or cells in the body. Recently and after the enormous development resulted from the handlechnology many mais are conducted to carry on the medicine to the injected cells in the body by using nanoparasites. These trials of the criginal lights have ted to the criginal lights have feld called nanobiopharmaceutics. As a result, the products user in this hold are called nanobiopharmaceuticals.

Key Jerms

- Carbohydrates. Car of yorates are biological matic polecoles have up of several simple molecules (monosaccharides of they ranked sugars, starches and forces. They also are made up of carbon. C), hydrogen CH, and oxygen. Or atoms with the ratio 1.2.
- Lipids upids are mological macromolecules made on of carbon (C), bydrogen
 (H) and oxygen (O) atoms. They made up of a large group of heterogeneous compounds. All lipids are insoluble in water and dissolve in nunpolar solvents asbenzene, and carbon tetrachloride.
- Proteins are biological macromorecules made basically up or carbon C, bydrogen Hill oxygen iO and outrogen N atoms They have high molecular weight and the ribuilding units are aming acids.
- Nucleic acids: Nucleic acids are biological macromolocyles. They contain nythogen oxygen, nitrogen carbon and phosphorus. They have wortypes RNA and DNA. They are made up of basic units called nucleotides.
- Metabolism: Metabolism is a group of plochemical processes occurring inside the cell. During these processes isomptex and macromolecules are broken down to release the chemical energy stored in them.
- Catabolism: Catabolism is a process in which some macromolecules (carbohydrates, proteins and fats) are broken down into simple molecules to release the chemical energy stored in them.

 aubourn entyrings powr of hydrogen (PH)





Unit One Exercises

First question: Multiple choice questions:

[†]	From examples	of d	tsacchandes.				
Α.	Glucose	a.	Ецістова	C	Calactose	D.	Sucrase
12,	Liquid ats form	ed t	y reaction of ur	ısatı	rated fatty acid	hvit	h g ycerol.
٨.	Olis	B:	Fets.	C.	Vicasces	D.	Chasesterol
3	Macromofec, le	45 C O	หลาก hydrogen.	UK!	gen nitrogen c	arbo	n and phosphore is
Α	Proteins.	e.	L กุรใต้ร	C	Carbohydrates	[D.	Nucleic acids
4	Building blocks	of p	nistera				
A.	Fatty acids	9.	Amino acids	C	Nucleic acids	D.	G ucose
5	Which of the fo	liow	ring is not mone	XII C	?		
A.	Glucose molecuse		 Amino acid 	- 0	A nucleoude		D. Protein

2	Which of the f	otlov	wing is not a fun	ction	of proteins	7		
Α.	Maintainance an Priormation	d tran	smission of genetic	ß.	Controlling	the rate (of reaction	
C.	Resistance of dis	eases		D.	Movement cuts do celo		riais inside and	
	Which of the fo	Hew	ing statements :	s co	rrect?			
A.	Simple sugar polysacchancie	äį	composed of	8.	Protein is con	sposed b	Lamino acids	
€.	Chycerol & comp) OK-BIO	of Letty acids	D.	Nucleondes ;	rus coust	noses of nucleic	
	How does the	enzy	me increase the	spe	ed of the chi	emical	reaction?	
A.	By lowering the	activa	tion energy	В.	By increasing	the activ	ation energy	
C,	By releasing ene	(EV		D.	By absorbing	спетку		
Te	intle chemical	thac	tion, me substrat	e bin	6 With the e	nzvane a	a region called II	lŧ
\mathbb{A}_{ϵ}	Promotor	Ø.	Resultant	<u>_</u>	Target	D.	Active site	
\$	Which of the tacids?	t lo	wing biological	mo:	ecules is cor	sisted (of gly erol and fat	
Α.	Sugars	Đ.	Starch	Ç.	Lipids	D.	Nucleic acids	

Second question: Give reasons:

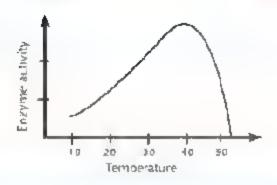
- The cotalysis of protein a humin produces amino acids only.
- There are millions of protein compounds despite that the number of amino acids is limited.
- Some animals can maintain their temperature in severly cold places.
- 4) Sudan-4 stain is used in detecting lipids
- Monosaccharides are the responsible for the processes of energy transferring uside cells of living organisms.

Third question: Compare between each of the following:

- [1] DNA and RNA with respect to pentose sugar and hitrogenous base
- 2 (5 mple and complex sugar with respect to diffinitions and give an example.
- 37 Anabol sm and catabolism.

Structural questions:

 The totowing tigure illustrates the relationship between the activity or an enzyme and temperature;



Temperature at which enzyme activity starts	
Temperature at which the maximal enzyme activity appears	
Temperature at which enzyme activity stops	
The thermal range of enzyme activity.	

Using results in above table, explain the effect of emperature on enzyme activity.



The cell is the basic unit of all the dimis. Some his oglergat, soms are marle og of alsingte cell white some others are made up of enormous number of cells. For example, the human budy is made up of 10 000 000 000 000 cells. Most cells are extremely troy to the degree that you can only see them by the microscope.

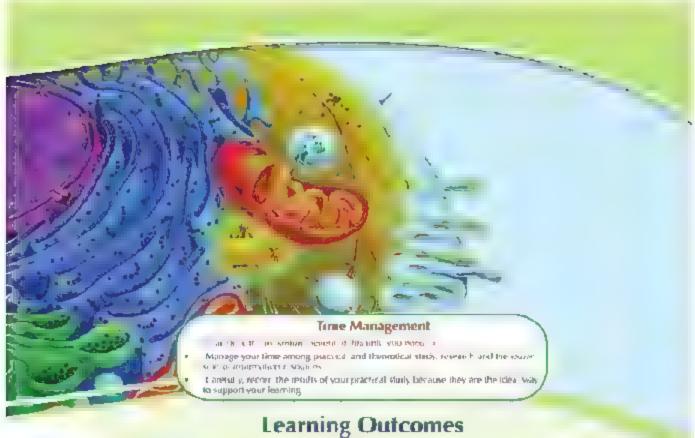
The cells are specialised to perform certain tunctions in the plants about in mais. For example, at the time you read these words, the herve cells in your eyes carry messages of what you read to the bodin cells and the muscular cells connected to your eyeballs move your eyes across the page,

Cells are collected together to form hissiles such as the nerve bissue or must plantissue. In turn, the different types of tissues form organs such as the eyes, heart and lungs.

All the cetts whether they are specialised or unicellular organisms share in general character stics. The cell respires feeds hids of wastes, grows reproduces produces similar cetts, and finally dies after a certain period of time.

The cells can perform all these functions because they have special structures called cets organelles, where each organesie is special sed for performing a certain function.

hor muse information about the topic of Cell-structure and function, log in the net-



By the end of this polt the student should be able to:

- Explain have the devoloping of the microscope early bute. to stare the cell theory.
- Appreciate the efforts of scientists in discovering the cales and their components.
- Explain the principles of the cell theory.
- Compare the animal and place of
- Draw the accurate gracture of the animal and manticell.
- Examine among, and plans cally microscopically.
- Mentify the arganettes of the pant and animal cells and the bare line of each of them.
- Explain the accurate size ture of the cult nucleus and its
- its the inestruction of chromosomes.
- Identify the dumber of chromosomes in terms types of the ing organic
- ach as early included in the married and

- Expedit the produce of the coll wall and its function.
- Explain the take of stasma membrane in the process of
- Compare between the providental and enhanvoire self-
- County the differentiation of cells into specialized thousage regard and systems in multidefallor assertal and plant by PERSONAL RIVE
- Adjust are the grandless of Allah in the digastructure of the cell is a marking unit or all living organisms.
- Obtaint he estimations handementations and give up clinging the option
- ratiow, up the scientific method its sature the problems.

Chapter 1: Celi theory Chapter 2: Cell ultrastructure Chapter 3: Offerentiation of cells and diversity of plant and animal tissues

Unit Two

Chapter 1





Cell Theory

ity the end of this chapter, you student should be able to:

- Explaint the principles of the cell than its
- xolair the development of the user crescopes
- Resize the role of the right and electron microscopes in studying the cell
- Appreciate the afforts or scientists or discovering the cells and heir comconerts

You know that all living organisms are characterized with common characteristics such as feeding transferring, respiration, excretion, motion, sensation and reproduction. Some living organisms are unicellular such as bacteria, Amoeba and Paramecium, while most of them are multicellular such as humans, whales, and trees

Diversity of cells



Figure 1. A group of various cells magnifiled 700 times of their real size.

Cell. The cell is the timest building unit in the organism's body capable of carrying out at the functions of life.

Observe the group of ce is illustrated in figure 1, then identify:

- What are the differences between these cens in regard to the shape and size!
- Determine which of these cells is the timest and which is the biggest.

key terms

- e jet illnages
- цф институт
- Button me reseape

A instang to your point of view, why cells differ from each other in the shape.

Celia vary in the shape, structure, and size as illustrated in figure (1). There is a relationship between the celi shape and the functions at heritomis. The leave left (neuron) is tong to be able to master the messages from the spiral cord present inside the vertebral column into your loss. The muscular cells are a safer zed by being by inducat and long and accumulate with each other to form muscle fibres. The muscular cells can contract and refax to help the animal move freely.

Enrichment

On all the els. he nerve cell neuron is he norses. The neight of a nerve cell tray each one motor or a high motor while the august rouse the osteoch untertilized egg.

Cell Theory

From the scientists which have contributed in developing the cell theory are scientists.

Robert Hook

He is an English silentist and has the favour in riscovering the leds in 1665 be invented a simple microscope and used it to screen a piece of cork. He found call the piece is composed of small poxes, figure 2. He named each box the word cell. The term cell is derived from the Latin word cellula which means the cell or the small room.

Antonic Van Leeuwenhock

Antonie van deeuwenhoek was burn in Netherlands in 1932. He spent his life as a gover shier tremployee. Van Leeuwenhoek was antateur it, screen injectis can be in sees. By using those lenses, Van Leeuwenhoek succeeded it making a simple interoscope will also by to magnify the objects up to 200 times of their realisize. He used this microscope for screening different substances such as water of points, and proximal treatment in the magnification of the microscopic organisms and fiving cells.



Figure 2: The draw which Robert Hook demonstrated for the cook bistue in the form of rows of sequenced spaces as he screened impughout the microscope.



Figure 3. Antonie Van "eeuwenhoek's microscope

Matthias Schleiden

In 1838, the German scientist Matthaus Schielden ded, ced that all the plants are composed of cells. He stated his conduction depending on his own researches and that of the other previous scientists.

Theodor Scawarm

In 1839, the German scientist Theodor Schwann deduced that all living organisms bodies are composed of cells

Develop your skills

Rudolf Virchow

Rudolf Vichow is a German doctor. In 1855 he stated that the cen is the functional and building unit of all living organisms. Aricmonally, the emphasized that the new cells are produced only by previous other living cells. Summariang skill

Burefithe role of scientisis. Rubert Hinds Amonic, Very Lectiven, Jels, Madkins Schlettlen, Theodor, Schwann, and Rank Evenhow in According the cross

The efforts of previous scientists have resulted in and gave rise to what is known by the cell theory. The cell theory is considered the most superfact basic theory in the nucleon biology. his cell theory is painty based upon the for owing three principles.

All living organisms are made up of cells

Cells are the basic functional units for a little aving organisms.

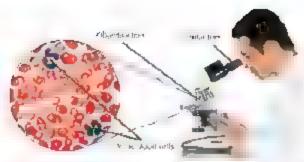
All cells come only from other pre-existing, lying cells

Development of Microscopes

The progression of landagy is the roughly passed within the level in ment of the technologies used to the surrounded telephologies used to the surrounded telephologies to about of sciences to observe and analyse. Among that the technologies the microscope was the most exportant tool.

Light Mecrescope

The light microscope was the only available tool for the scient sist until 1950. This microscope depends on the sunlight or artificial light to work. It is characterized with its ability to mageity micro-longanisms and ponliving things, it is also used for screening the composition of large's zero objects by slicing them into thin slices that a low the light operate through The light my roscope could magnity the object is \$5.00 times of their acidel size according to the magnitying prover of the two lenses used lobjective and ocular lenses. These lenses are made or glass and they can not magnity more if all 1500 times because the image with be biurred cancient.



I gains 4: White blood call, as soon by a compound highli microscope. The image is stage field. Of thippes its prises size.

The total magnifying power of the right interoscope can be calculated through the following relation.

Magnification = the magnifying power of ocular lens - the magnifying power of the objective lens.

Over years, scientists it novated better methods to observe the samples more clearly throughout increasing the contrast to figure between the different parts of the sample. One method of these contrast methods between the sample parts was using the dives to all not colour certain parts of the sample to be clearer. Sam larry when we screen the white blood certs as illustrated in (figure 4). On the contrary, using the dives involve disadvantages such as they kill the living samples. There is another method to increase the contrast which is more by changing the level of light.

★ Ukserver How does the contrast between the three images in figure 5 seem? Compare them.

Electron Microscope

In 1950, scientists started to use the electron start scope in which a again of electrons with high-speed is used instead of light. These electrons are controlled by electromagnetic lenses. Objects can be magnified 1000,000 times of their actual sizes.

The electron microscope provided a field to clarify the certain components that had not been known before. It he pis to know more accurate details for the structures that had been known before because the electron microscopes provide high resolution magnified, and highly contrasted images comparatively to those produced by light microscopes. It is related to the shurtness of the

■Life Sk Us----

Constitute ation Skills

Use the references in school brary or the nternet to write down a report about electron microscopes. Review your report with your teacher then display it in front of your classmates to discuss it.

wavelength of the electronic ray comparatively to the light ray. Objects images are

received on a fluorescent screen or on a highly sensitive photographing heard.

There are two types of electron microscopes, the scanning electron microscope used for studying the cell surface, and transmiss on electron microscope used for studying the internal structures of the cells.

Observe the image of the white blood delibered the two types of the electron microscopes-scanning and transmission.



Figure 5. A white blood cell as it appears under the scanning electronic microscope (magnifying power and > 3,000) and as it appears under the transmission electron microscope (magnifying power and >6,000).

Compare the 10W Images in the two coses...

 Thus, you can see that the development of interescopes increases our knowledge of the science of cell (Cytology) and its related sciences.

Activites and Excersises

Chapter

Cell theory



Ideal using of the compound microscope

Safety precautions



Activity goal

county at impacting matter specrease from the missimp wars that details that can ope the stein by maked spec-

Acquired skills

Using scientific designs of observing, comparing, renording, and analyzing data.

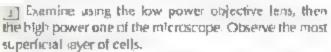
Materials needed

An arrive a glass alide, coversity, for epofercepts in compound one except is aligned in a paper into personal for a safetime. You will use the compound microscope it severa at 12 lies You can use it correctly in this activity.

Procedure: ...

- Cut the onion into 4 pieces.
- of the thin transparent membrane lining the concave surface of one of the pieces. Put it on a water drop place

of the pieces. Put it on a water drop placed at the middle of a grass slide, then cover it with a covership.



so a biother to remove excess water their add a drop of lodine in an edge of the covers, pillot the will diffuse throughout the specimen.

Re-examine the specimen using the low, then high power objective lens of microscope. Observe the difference.







- Observation and data recording and analyzing
- Observe: How many cells that you could see using low power objective lens of microscope?
- Observe: How many cells that you can see using the high hower polecular tenens?
- Oliserve How did onion cells appear using rodine solution instead or waler?
- es Conclusion:
- Why is the microscope used?
- How can microscope be used correctly?

Unit Two

Chapter 2

Cell Ultrastructure

By the end of this chapter, you should

- Bloth in organishing in stand and
- and the ellicate and constructed by Figure 10 to 10 to
- Doscribe the absolute of the chrome-
- Explain the objection of the planma memberne.
- Explain the distribution of the cell wall age of a fator fine
- Avertier zaile, des granvieren eit Atlah in the account to a time of the bunding init of living organisms.

 Design a model for the eukaryotic cell.
- Compare between the enkaryotic and
- prohaveour elli-
- Compare between the plant and arr-
- Examine the plant and attimaticells inвом прина
- Uses the ultractate of the plant and Antenia ruda

key terms

- e e sendampe
- A) p
- Intiliary.
- m disclination
- e again
- मेर महोराईआहर
- and the age of the little
- Codgress dv.
- AND SHIP
- Africa as modern
- Commission
- Fhioriposts
- Killery Inter-
- Profesyotte cell
- fulcayatte rell

You have learned that the cell is the functional and holding and prail fixing arganisms. These reliaare characterized by their ability to grow, reproduce respond to external stimuliand perinting the disterent metabolic processes.

Th nk

- How can a cer perform all these functions?
- What are the structures present in the cell that enable in other own these famotions?

Cell Parts

The cell is basically made up of a protopiasmic mass surrounded by the cell membrane. The protoplasm is differentiated into a nucleus and cytoplasm. Cytoplasm contains a group of cellular structures called cell organelles,

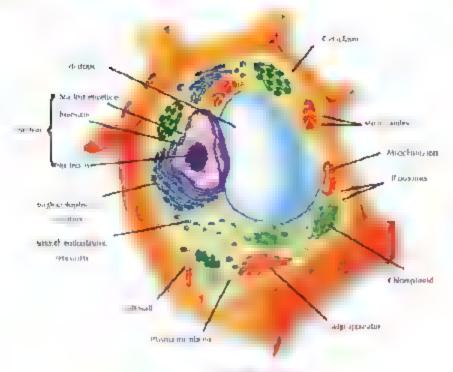
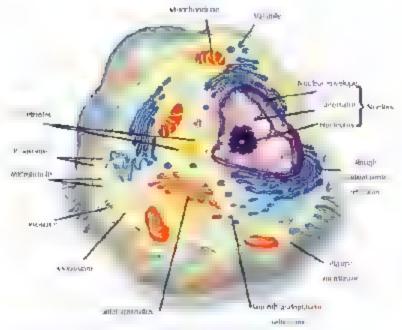


Figure # Plan red)



Signification Amountained

First: Cell wall

Cells of plants, algae, fungi and some pactern are surrounded by a cell wall besides the cell mem mane. This wait aroundes the cells with surport and protection. Cells value that activity acceptance to the viole fibers, therefore this wall allows the passage of water and dissolved substances through it easily.

Confelopment

Cell walk play an important role in protecting the cells and making them resistant to wind and officer was her factors. These was he provide the cells with strong support as in the perenn all trees such as paint trees. While herbei small plants dentain cell walk with little erasticity that make them able to maintain her shapes as they are exposed to strong wind.

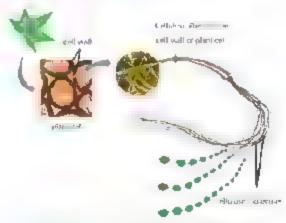


Figure 8: Callulose tiben in the cell wall of the plant cell

Second: Cell membrane(plasma membrane)

It is a thin membrane covering the cell and separates its components and surrounding medium. This membrane performs a basic role in organising the

basic role in organising the passage of substances to and from the cell. Besides, it prevents the apreading of cytoplasm outside the cell.



Coll membrane is composed of two layers of pliospholipids inclodules which their hydrophilic heaps (dissolve easily in water) meet the water medium in and out height which here membrane, figures 9 and 10.

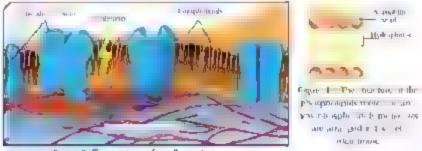


Figure 9: The structure of a cell membrane

Majecules of proteins are embedded between majecules of these two layers Some of these protein molecules work as cell identification sites to different substances such as nutrients and hormones. While some others work as gates to pass the substances to and from the cell-

Due to the phospholipids forming the left membrane are a fluid substance, the membrane in turn is considered a fluid structure isimilar to the oil boahing on water surface). The impage of prosphorialds molecules with molecules of cholesterocontributes maintaining the cell membrane cohesive and intact.

Third: Nucleus

The nucleus is the most obvious organeile in the cell that you can see under the microscope. It often has a spherical or oval shape and located in the middle of the cell Forthermore, it is surrounded by a double membrane called the nuclear envelope. The nuclear envelope separates the dunter its of the nucleus from cytopinsm. There are several invigores -- he nuclear envelope through which the substances pass between the nucleus and the cytoplasm.

The nucleus contains a transparent getatilious fluid called nucleoplasm. The had expressing contains minute tangled threads coired around themselves and called chromatin. The nucleus also comains another structure called nucleolus. Figure 11). The cer nucleus may contain more than a nocleorus, especially in the cer's regionsible for forming and producing the protein substances such as enzymes, normones and so on

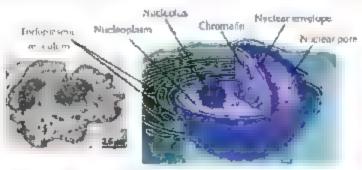


Figure 11 Structure of the nucleus

Structure of chromosomes

During cell division, chromatin gets changed into rod-like structures called chromosomes, figure 12. Chromosome appears in the metaphase of the cell division consists of two threads joined together at a central part called centromere. Each thread of those two threads is called chromatid. Pipure 12 Behaviour of thromosomes figure 13. Each chromatid is composed of suc eld-



rluting cel division

Biology Unit?

acid DNA coiled around morecules of proteins called histone. DNA carries the genetic information that controls the snape and structure of the cert and organises the vital across es of the living organism certs. As your body, rais arounder ted from your ancestors and you, inherited them, in augmout transferring conies of the slored genetic materia, which is being copied to the new generations during reproduction.

Word meaning:

Chromosomes were given this name because they are stained by the basic dies and take a coloured stain that makes them more clearly seen during cell division.



Figure (13): Chrumwome a appeared writer the electron microscope our specific division.

Do you know?

Chromosomores not consisted of 2 chromatids in all phases of mitosis except at its beginning till its metaphase to becomes consisted of one chromatid in an aphase and telophase, and called daughter chromosome. At the beginning of each new division, the geneuc material its duplicated, so each chromosome consists of 2 chromatids.

Fourth: Cytopiasm

The cytopiasm is almost a fluid-like substance present between the cell membrane and nucleus. It is mainly composed of water and some organic and inorganic substances. It also contains a network of threads and microtubules that acquire their Lasupport to be put maintoin disabane and form. In addition to its work as maskages to transfer the different substances from one place to another inside the cell and is called the cytoskeleton. The hytopiasm also contains a group of various structures known as cell organelles. Some of these organelles are not surrounced by a membrane and centrosome. While some of their organiciles are surrounced by a membrane and centrosome. While some of their organiciles are surrounced by a membrane and called membranous organiciles such as endoplasmic reficulum. Goig. apparates mitochoridata lysosomes, vacuoies, and plastids.



Ribosumes

Ribosomes are round-shaped organizes that synthesize protein in the cell. Some of them are present in the cytopiasm (single or in clusters, where the proteins produced a silidate divitercased in the cytopiast. The cell uses it mits vita in occases such as growth regeneration and scion of the most ribosomes are attached to the outer surface of the endoplasmic reficulture and produce the proteins transferred by ends plasmik reficuoum to the outside of the cell (such as enzymes, after entering same changes to it



Centrosome

Animal and some fungi cells (except for nerve cells-neurons) contain two tiny particles called centroles. They are located near the nucleus in a region of the cytoplasm. This region is called centrosome.

The centrosome is not present in the plant and some fungi cells. These cells contain a region of dytoplasm to conduct the same functions instead. Each centricle is composed of nine groups of microtubules ordered in triples in a spherical shape, figure 14.

The centrosome plays an important role during cell. division where the spindle filaments extend between the centrioles present at each pole of the cell. The centrosome also plays an important role in forming the flagel a and cilia.



Figure 1a Cente-ofer



Endoplasmic reticulum:

The endoplasmic reticulum is a network of membranous canalicular hat extends in all cytopiasos. Is attached to the nuclear envelope and Leif memorane, bolifforms an internal transferring system that benefits in transferring the substances from a part to another incide the cer and so handering, the constances between the nucleus and the cytopiasm Thinking corner

There are two types of the endoplasmic reticulum.

There is a rough endoplasmic reticulum and smooth endopiasmic reticulum. The rough endopiasmic reticulum is characterized by the presence of a large number of Biosonies on its surfaces of its special zero in syr resisting proteins in the ceit, making changes on the protein produced. by the ribosomes, and making new membranes in the ce-As for the smooth endopulsmic retir dum, the ribosomes. are absent from it. It is specialized in synthesising lipids, transforming glucose into glycogen, and modifying he nature of some toxic chemicals in the cell to reduce its ramufal effects.

the meence if smooth endopts sink ret aligns or peases in heptir rells, White the aresence of mulgiencion/asmic retribution: increases in ellis af stomach imie no endor rine glands. Expl. in this in the light of your stativ of main dasmic reficulum functions.

Birdogy (m. 2



Golgi appara-us

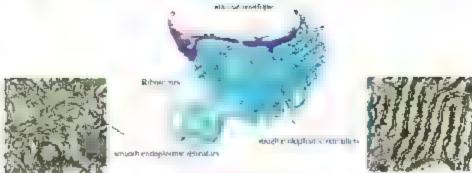


Figure (15): Endoplasmic reticulum.

Golgi apparatus is a series of flat membranebound sacs. The numbers of Golgi apparatus differ in the cell according to the cell's secretion activity. Golgi apparatus is specialised for receiving the molecules of substances secreted by the endoplasmic reticulum across a group of transporting vesicles. Then, it classifies and modities these vesicles and distributes them into the places where they are used in the cell. Golgi apparatus may also pack them inside secreting vesicles called lysosomes, that move forward to the cell membrane as the cell dismisses it to outside as secretory products.

Word origin

Coign apparatus is named for its discoverer, taliam anaiomisi and pathologist Camillo Goignoho described it for the first time in 1898. This organizate is also known as Goigt complex or Goigt apparatus, it is also known as dictybeomes in plants and algae.





Lysosomes.

Lysosomes are small, round, membranous vesicles formed by Go g, bodies. They contain a group of digestive enzymes. Lysosomes function is to rid of worn and sen leicel's and organelles which no longer have benefits. Furthermore, lysosomes digest the large molecules of nutrients engulted by the cell and change them into structurally simpler. substances to enable the cell to benefit from them. For example, white blood certs use the digestive enzymes present inside the lysosomes to digest and destroy the pathogens. which invade the cell, figure 17,

The cell is not affected by the lysosome. enzymes because these enzymes are surrounded by a membrane lisolating them. from the car camponents.



M: tochondria



Go Further

For more knowledge shout this topic you can refer to the Egyptian Knowledge 💽 Bank (EKB), through the opposite link.

Mitochondria are sac-like membranous organelles, its wall consists of two membranes. A group of folds known as cristae extends from the inner membrane into its matrix. figure 18. These clistal work on increasing the surface on which he chemical reactions producing he energy lake. place. Mitochondria are considered the main storehouse

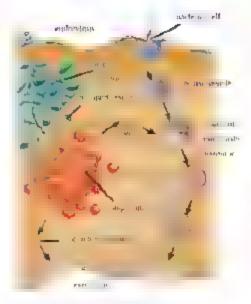


Figure (17): The tole of tysosmes, it digesting the pathogens inside white blood cells



Thirtking cornemer

Imagine the inner nicorbrane of mitorhendita does not contain crisiae Does the efficiency of mischanday increase. II WELLOW EN DUD

for the rusp subtry enzymes in the cell. They are also considered a storchouse for other substances necessary to store energy resulting from respiration, due to the coloration of he nulrients, especially glucoser. The energy resuling from respiration is stored in the form or a chemical compound called adenosine inphosphate ATP) from which theire can extract energy once more



Figure 18), Mittadsondrient

Vacuoles

The vacuoles are sac-like membranous sacs (similar to bubbles filled with a liquid). They store water, nutrients, and the wastes of the cell until it gets rid of such wastes. The valuaties hie spoal land, large in hall their a animal cells white they are collected in one big vacuoie or more in the plant cells.



(B) Plashds

The plast ds are various shaped membranous organizes present in planticells. only. There are larger types or plasticks that differ from each other in regard to the pigment present in each type:

- White plastids or Leucoplasts. They are plast ds that for it contain any type. of pigments. They work as centers for storing starches. Furthermore, they can be present in the roots or sweet potatoes, stems of potatoes and the internal leaves of cabbage
- Chromoplasis inequate prostids that contain caraterious which dien colours varies between red ivellow and orange. This lyne extensively spread in the petals. of flowers, fruits and in the roots of some plants such as rapeseed
- . Chloroplasts They are present in the caves and stems of green plants. They contain the chlorophyl it all careforms. the light energy of the sun into chemical energy in he orniof glacose throughout phot isvishesis. Charopiasis are composed of a double envelope surrounds a matrix italied the stroma. The stroma contains layers of disc shaped, compact structures known as thylakoids which each group. of them forms what's known by granum. (figure 19).

Enrichment

the colours of the alan cel are related to the chromiapiasis as a the petals or he flowers or the presence of some coloured pigments in Moplasm as in beet and resette.



agent (198 Ac assorbas)



Fix more knowledge about this topic you can refer to the Egy man Knowledge Bank (E&B) through the opposite onk



Activites and Excersises Cell ultrastructure

Chapter 2

Practical activity

comparing plant and animal cells

Safety precautions



Activity goal Comparing the plant and animal

Acquired skills

Working in a team observing according deaving recording and analyzing data. Concluding Alesigning experiments

Materials needed

Class tildes. Endba plant leaves, forcept dispiret water prepared side of human check cells, compound light microscope.

Cooperate with your colleagues in the group to perform this activity and discuss them about the observation the have reached Explain and compare the results with that of 2 other groups. Participate in expressing an opinion during the group discussion that occur under the supervision and gordance of your teacher.

Procedure:

- Lise forceps to separate a young leaf from the tip of Elodea plant and put it on a drop of water places on a glass slide. Cover with a coversup.
- Examine the leaf by the low power objective lens (4x) of the microscope, then by the medium power

one 10xt. Observe the superficial layer of leaf cells .

- Draw some cells you saw. Label its different structures
- Example the specimen using the Light power objective lens (40x). What are the cet was structures volumes even observed now? Draw these structures inside the cet is that have already drawn and label them.

5	Repeat	the	steps	(2	4.)	with	the	prepared	slide	αſ	human	check	certs
---	--------	-----	-------	----	-----	------	-----	----------	-------	----	-------	-------	-------

Birdogy Conta

45

- Recording and analyzing data:
- Record the common and different structures you observed in both the cell of Elodea plant and the cell of human's check in the following table:

hodesplantic	dragus neck et	Comments resid

- 2 What is the cause of plant leat colouration by green colour?
- → How can you make the structures observed in the plan leaffieds more visib c?
- What are the organettes you expected to see ib it did not appear at examination?
 Explain the reason.
- Conclusion:

What do you conclude from this activity?

Applied with the



Designing a model of cell membrane

Safety precautions



Activity goal

Designing a model liketrates cellmenticace

Activity skills

Observing attainer, sum history.

Materials needed

GEAST Joh, singeted armal, water and figure anything.





Procedure:

- Bring a water filled glass dish
- Add a suitable amount of vegetable oil till cover water spitace
- Disperse a little or the fine sawdust on the or layer surface.



- Observation and data recording and analyzing
- Observe ' What will happen to oil after pouring it on water surface?
- [2] Observe What will rappen to sawdust after its dispersing on or surface?.
- 7] Analogy Whow what each of water , o , and sawdust represents in structure of cell membrane?
- Conclusion:

What do you conclude from this activity?



Designing a model for the chromosome

Safety precautions



Activity goal

pleagrang a recitor for the thromesome using environmental majembs

Acquired skills

recignity browing working to ar evalua-

Materials needed

bullate desira non habitan magnetic precess placers on metallic stall-

Procedure:

Se the pincers to cut the electric wire into equal pieces about 30 cm each





- Ro, the wire around the metal ic stalk to get a spira-- shaped wire.
- Fix the metallic wire upon the disc-shaped magnetic preces.
- What does each spiral piece of wire represent?
- What does the magnetic piece represent?
- What is the difference between the 2 figures (A) and (B):
- (B)
- Are the thromosomes equal in size?
- FI Design another activity shows the chromosomes using wood or cardboard as in the opposite figure
- Are the chromosomes equal in size?







- What does it mean having a heterozygous chromosomes. - in the opposite párr figuret
- What do you conclude from this activity?



Assessment activity

- Till Study the following igure, then answer the following questions.
- Write down the name of numbered parts:

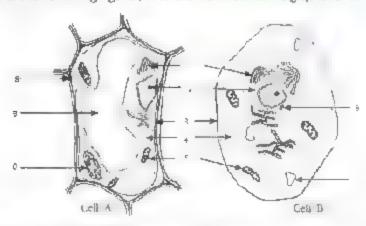
1

2





Examine the following figures, then answer the following questions:



- Name the following numbered parts:
- 1. Commonweal and a 2. Common of the 3. Commonweal and 4.
- $5. \quad \text{proposed to the second of the secon$
- What do you expect to happen when the organelle no 2 is removed from the cell? Explain

- In high of the study of the distinguishing characteristics of both proxaryotic and eukaryotic cells. In front of you a picture of a microorganism that live in the human as mentary canal. Specify the type of the cell of this organism, prokaryotic or eukaryotic ? Explain.
- The tollowing table shows some information about three different cells. Determine whether earlies I is prokaryoff corect karyoff it any of them is a likaryoff determine whether it is point or an inal cell. Give an explaintion or he decision taken in each case, with each cell.

The strict re	, ed A	ലെ 15	relC		
Cell wal	present	present	not present		
Cell membrane	a eser t	oresen,	aresen		
Chroroplastids	present	not present	not present		
M tochondra	ртекерт	not present	rxesen		
Nucleus	ף בזבו ן	not present	я съсн		

- Cell (A) type:
- Cell (B typer)
- Cellact type:
- The explanation.

Unit Two

Chapter 3

Differentiation of Cells and Diversity of Plant and Animal Tissues

By the and of this chapter, you should be able to

- Identify the organization levels in the medice/february organisms.
- utomity the concept of tissue.
- Different all between the simple and complex tasues
- Edwardy different types of animal and plant viewes.
- Determine the functions of the this up.

Key terms

- Or up to there we
- Comproves Out in
- Painti home
- Collegender
- Surrecords ma
- Aylen-
- Filheer
- Epidlophal bissure
- Connective System
- Michigan San
- Nervous 8 rue

Most fiving organisms are composed of several cells. But, are these cells irregular or disordered? Does each of them work separately from the other?

Organization of Living Organisms

Cots are special zed in their functions, so they are present in types but not one. Each group of specialized cells organize to form what is known as a tissue. For example, the heart muscular tissue of the heart wall, figure: 20.



Figure (20): Managian disease in heart well



Figure (2) h Heart

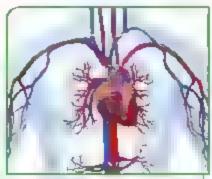


Figure 22 of a laters system

If the cells forming the tissue were symmetrical with each others in the shape, structure, and function, then the tissue is called a simple tissue.

But, if the tissue is composed of more than a type of cells, then it is called a compound tissue. Types of tissues vary and contrast in regard to the difference and diversity of living organisms and so are the activities and the vital functions conducted by the tissues. We will

identify the most common types of tissues, a animals and plants in the foilowing, Inmost living organisms the bisses organize with each other in groups called organs Each organ is a great of issues working harmonly to perform certain unclions Such tissues and organs are present in plants and animals. For example, the heart figure 21, is an organ in the multicellular organisms such as humans. It is mainly composed of a heart muscular history revise, and can active history. He in must lesnerves and connective tissue co-rabbilities bygether in their work to purify the bright from the heart to all body parts

The group or organs working together, form what is known as the system. The heal, block and blood vessles can the circulatory system or homa is ligure 22. Systems organise and integrate logether to forcing the whole body of the organism in the human link, is composed of the integration of several systems besides the including system such as skerelal system, muscular system, pervous, system, digestive system. respiratory system, excretory system, reproductive system and so on-

Plant Tissues

Plant tissues vary into simple and compound tissues.

First: Simple tissues

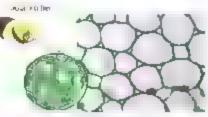
There are three types of simple fissues:

Parenchyma tissue: The cells of parenchyma pisues are oval or mund shaped. They walls are soft and elastic and contain spaces among them. for aeration. The parenchyma tissue contains chloroplasts, chromopiasts, or leucopiasts.

Parenchyma cell contains one big vacuore or more (fled with water and mineral saits. The parenchyma tissue performs several functions. such as photosynthesis, storing nutrients such as starch, and it is responsible for lagration.

Collenchyma tissue: The collenchyma tissue is a soft tissue. It is a living tissue and its cells lare. somewhat rectangular shaped cells. Its walls are gregularly thickened with cel ulose. This tissue helps in supporting the plants by acquiring them. the elasticity needed.

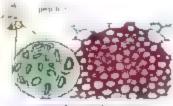
Sclerenchyma tissue: The sclerenchyma tissue is a solid tissue, it is a non-living tissue. The cells of these fissues are thickened by a substance called lignin, in addition to cellulose, it also strengthen and support the plants and acquiring them the elasticity and hardness inceded.



Flaure 23): Parenchyma lissue



Figure 24 Callend maintain



In our or how a recip



Go Further

For more knowledge about this topic I you can refer to the Egyptian Knowledge & Bank (EKB) through the opposite link



Second-Complex tissues

Examples of complex tissues in the plants are vascular tissues the conductive tissue. Buy are mixined microwritypes, sylem and placem. Their function is the transport (conduct in the plants,

Xylera tissue

 The following link in the Egyptian Knowledge Bank (EKB) illustrate the structure and function of Xy emitissue

Philoem tissue

 The following link in the Egyptian Knowledge Bank (EKB) is ustrate the structure and function of Phipens tissue





Animal Tissues

Animal tissues can be differentiated into four basic types. Each of them matches with the function it performs:

This fipst what has resulting one the issues that cover the outer sortace of the body or line-up the body's microal cavities. This optimizes is soon is composed of a great number of Gusely adjacentices submitted by the interstitual substance.

The epithelial tissues are subdivided into two basic types with respect to the shape and structure.



Simple epithelial tissue:

Its cells are organized in one layer, figure 26, the example of this lissue are

Soo to square our search I is composed or one laver of tlattend cells as in the endothebum of blood capillaries and the walls the aveo Lin the lungs.

Simple cultividal testion his composed of one layer of a boundal cells as in the linear of kidneys' tubules.

Some te columnar I save. It is composed of one layer of columnar cells as in the lining of the stomach and the intestines.



Figure (36): Examples of simple spillbuils, 1 putps.

विवादिक व्यामाना स्टब्स् ५:स्स



Its cells are organized in several layers, figure 27, its examples are:

Stratifled squamous tissue It is made up of several layers of correpact cells above each others. The surface layer of this fissue is squamous as in the skin epidermis.



STRAMOUS ASSESS

The epithe in tissue performs different functions with respect to its site such as.

- Absorbs water and digested food as in the lining of the digestive canal.
- Protects the collision of covers from drought and pathogens as in the skin epidermis.
- Secretes the mucos that makes the cavities it covers smooth as in the riigestive. canal and the trachea.

Second: Connective fissues

The innective tissues are made up of somewhat ristant cells that immersed in an interredular substance that may be fluid, sem-solid, or solid (figure 28) Accordingly, they are divided into three groups:

on necline tissue proper it is the most widely spread upon it gathers between being airly solid and quite elastic. The main function of this issue is to bind the diberent bases and systems of the oddy with each other. This type is present under the skin and in the mesenthes

She ethil on rectile tissue. It includes the bones and carringes. It contains a 5 dia ercentina substance in which calcium precipi ates in case of the bones. I si basic function is the supporting of the body.

A histolar county liet tissue. It includes the brood and lymple If ud intercel ular substance its basic function is to transport digested food and excretory substances.









Figure 28): Examples of connective rissues

Third: Muscular tissues:

The cells of this tissue are known as muscular cells or muscle fibers. They differentiate from the rest of body cells with their abilities of contraction and relaxation. This helps the organism to move. There are three types of muscular Missues.



Smooth must less

They are composed of unstrated love up ary prosess filters. They are present a little walls in sisceral such as the wall of diges, we can all up not it bladder aim aloud vessers



Skeletal muscles:

They are composed of striated voluntary muscle fibers. They are usually connected with the skeleton, such as muscles of arms, legs and trunk.



Cardiac muscles:

They are composed of striated involuntary muscle fibers and present in the heart wall only. They contain special parts called interestated discs that bind the muscle fibers together and make the hear beats in a rhythmic way as a functional unit

 The following link in the Egyptian. Knowledge Bank (EKB) illustrate the structure and function of muscular tissues



Figure 29 Smooth muscule fibres



igure . J. "ke ela muscle fioras



Injurie 4 - and accomplished

Fourth: Nervous tissues:

The cells of nervous tissues specialize in receiving sensory stimuli whether they are internal or external the body and connect them to the brain and the spinal cord, ther transmitting the moto impulses rum one of from to effector organs muscles or glands).



Co Further

For more knowledge about this topic ? you can refer to the Egyptian Knowledge 🏖 Bank (EKB) through he opposite ink



Science, Technology and Society



Stem cells

Recently, scient sts have discovered that there is a type of cells has the ability to form any other type of specialized cells such as muscle. ells, iver cells, herve cells and skir cells. This can be lone according to specific environmental realments at

the laboratory. These ce is are called siem cells. These cells are formed during the early stage of forming the embryo. As a result, scient its and doctors are hoping to use such cells to treat a group of intractable diseases. such as using these cells to produce dopamine used to treat those suffering from Parkinson disease or to transplant stem cers to give cardiac muscle cells as compensation about the damaged cardiac muscles in heart patients or getting cells producing he insulinhormone as a compensation about the decrease of secreting this hormone by pancreas for diabetes patients and other diseases



Embryo cells in the early growth stages.



Cell fractionation

Technology of cell fractionation is one of the modern technologies used to study each type of different cells forming a certain tissue. Studying the different organisties forming one type of cells includes studying the site of these organelles, their functions and their components. Cer fractionation technology benefits in studying the cellular molecules such as biological macromolecules like enzymes. Furthermore, studying biological processes. occurring inside the cell

The Cell fractionation technology depends upon using altracentrifuge apparatuses to separate cell organelles at different speeds depending on the different densities of these organelles



Ottracentrituge

key erms

- Cell theory: It states that the cell is the basic functional unit of all living organisms. Organisms are composed of cells and those cells may be single or ingroups. All the cells originate from pre - existing cells.
- Parenchyma tissue: It is a bissue made up of pregular sheped cells with thin. walls - tiperforms several - uncorons such as photosynthesis, storing nu rients such as starch, and agration.
- Collenchyma tissue: Lisca living tissue and its cells are somewhat reclangularshaped. It has thickened, irregular walls uncovered with legnin.
- The sclerenchyma (issue: 1 is a tissue strengthening and supporting the plants.) and protecting the internal fissues.
- Epithelial tissue: It is a tissue covering the surface of the body from the outside. to protect it from external stimul such as temperature, drought, and pathogens
- Connective tissue: The cells of this fissue it elsomewhat distant and present it. fluid, semisolid, or solid interceilular substance.
- Muscular tissue: Its cells are known as muscue de ls or muscular fibers. It is distinguished from ail the body cells with its ability to contract and relax.
- biervous tissue. Its cells are specialized in receiving the sensory stimuli.
- Chromosome It's a structure appearing in the metaphase of cell division, it is composed of two filaments each of their called chromabd. They are connected at a central part called centromere

Conseptation of Chapter II will Hiving Organismo The structural and functional units are divideo intu-F de d Collimentarine Free tres Crimples Contain (mair. Cellular organelles

Unit Two

Activites and Excersises

Chap er 3

Differentiation of cells and diversity of plant and animal tissues



Examination of different types of plant and animal tissues

Procedure.

Safety precautions



Activity goal

identification of different types of plant and americal besters

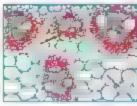
Acquired skills

Observing secontific desiving online and analyzing data

Materials needed

Prepared states of various plant and written tissues and compound materials at a

- Microscapically examine a group of sides hat your teacher will give you
- Compare these slides with the following figures, then answer the rollowing questions



Sade no 1)



Side no (2



Stide no. (3)



Slide no .4)



Slace au 5,

Specify the types of tissues in the slide not t

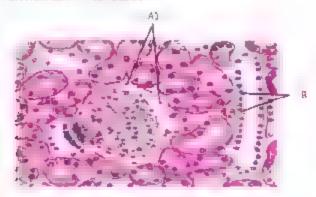
A-

B.

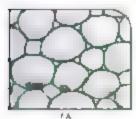
- [4] Mention the types of tissues shown in stides 2) 3 4) and a
- Si de no. J.
- Si de no (3)
- Side no. 4
- Side noi 5

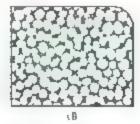
Assessment activity

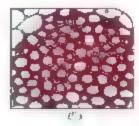
The tollowing tigure illustrates the histological structure of a section in kirdney. In ight of study of distinguishing characteristics of animal tissues, specify the types of tissues that referred to in this section.



- The type of tissue (A).
- The type of tissue (B).
- [2] The following illumes show 3 types of plant tissues. Examine these issues, then answer the following questions.







- Mention he name of each tissue of them.
- Identify the type of the precipelated material on the walls of the tissue cells (B) and (C).

Second unit exercises

First question: Give the scientific term for each of the following:										
A microscope, its magnification power reaches to 1500 times at maximum.										
A tracue consids of one type of cells.										
A liesure covers body surface externally and lines body cavities internally.										
Tissues that their cells are specialized in receiving the different external stimuli.										
Muscles composed of solated muscle fibres, and do not under the will in their work.(
Paris of muscular tesue of the heart that make it pulses as a functional unit.										
[2] Cellular structures responsible for protein synthesis.										
Cellular structures respons the for energy production in the cell. (
[6] Minute interlaced filaments that are lightly could around themselves and change into										
chromusomes during cell division. ()										
Second question: Choose the correct answer:										
Chioroplastids in the plant cell is concerned with:										
A. performing photosymbosis B. storing energy C. storing energy floor Disservering protein	H,									
a) plasma membrane consists of •										
A, one layer of phospholipids 8. two jayers of phospholipids										
C two rayer of cells lose D: two rayers of chinn										
The small particles that found on the outer surface of rough endoplasmic reticulum are the										
A. Centrosome B. ribosomes C. cytoplasm D. plastids										
4] All the following organisms are found in the animal all except:										
A. centrosome B. mitochondria C. golgi apparatus D. chloropiasuds										
 The result responsible for its isplaning water and sails from the ruot in Leaves is the 										
A. ayleni B. phicem C. paretchyn D. collenchyma										
Third question: Compare between each pair of the following:										
1] right and electron microscapes										
3.1 Cell membrane and cell wall.										

Fourth question: Give reasons for each of the following:

- Naming skeletal muscles by this name
- Epithenal tissues cover body surface externally
- Lysosomes can decompose the sente and worn organe is.
- [6] Gotgi bodies are abundant in glandular cells.
- Plant cel s have a d finit shape.
- Plasma membrane has an important role in the cell.
- Planticel's can perform photosynthesis, whereas arimal cells can not do this process?

Fifth question: Mention the role played by each of the following scientists in discovering the cell!

Robert Hooke. T Schleiden.

Schwann T Virchow.

Sixth question: Mention the function of each organelle of the following:

, centrosome.

📆 Golgi bodies. 🗊 Lysosmes.

Miscellaneous questions:

- Mention the main principles of cell theory?
- Write down the name of 2 cellular organicles and their function.

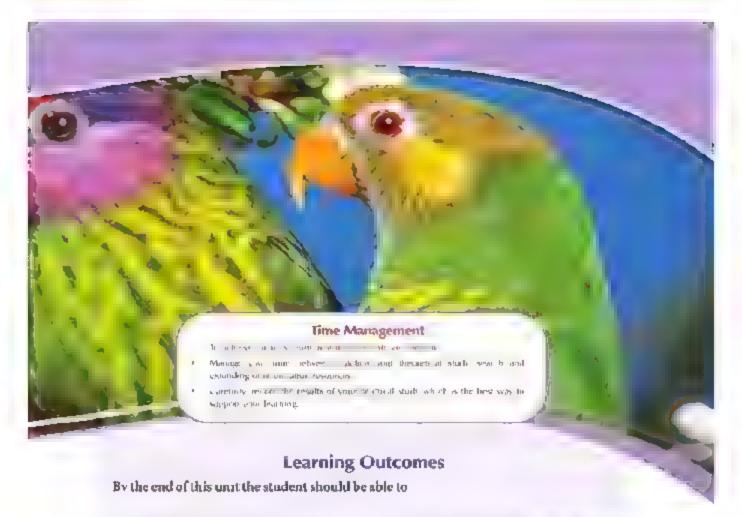


We have blue, brown, green and gray eves. Also we have had of different allows - black prown and Lionce. We see the organizations sparrows with green blue and yellow feathers. From where all these colours of living organisms come? How do these characteristics transmit from parents to their offspring?

he ancient prevailing belief before mendel's experiments was that these colours are produced by the colours in xing theory it is believed that the hybridization between two parrors, one with yellow leathers and the other with blue ones, will produce parrots with green feathers.

Recently latter discovering the chromosomes and the traits they carry on the concept of its is other lance has been changed and becomes obed entito laws and mechanisms which control the transmission of traits from a generation to a rother generation. The prediction of traits appearance in the produced individuals becomes more arcurate and this helped in the prediction of genetic disorders in the offspring. This aggrandizes the importance of the medical examinations better marriage to avoid the transmission of genetic diseases to offspring.

for more unformation about the topic of Inheritance of Traits, log in the pet-



- · Espain de l'autoson shout-
- all with a but of more retiled to a revolupe.
- dentity in the expension of medium and attended and attended a
- भगवाः विश्ववादयाः । एकपूर
- · Stemm what a nice of locus against
 - committee the second general record on
- implies abgress over comm
- তেওঁ কৰিছে প্ৰতিপ্ৰতি আধিক প্ৰতিক্ৰমণালাই কেনিউনিয়াৰ উপ্ৰতিশিক্ষ তেওঁ কৰিছে ক্ৰেন্ত কৰে ক্ৰিয়াৰ উপৰিক্ৰাপ্ত ক্ৰিয়াৰ ক্ৰিয
- Egitari kow olooc, groups are inherited in humans
- Explain how theses tampris inherited.

- displain the ask of according to pursuance of a decay incording.
- Across some events and fluorised and deoperación.
- Jishangjush kabandéh sarah jadhar ndi 8665 M disk nasalakés a a na a
- Mr. In some month one cases in the interferons in generate dispersions is coming in the ring.
 Non-desirable dispersions are considered in popular polytrops.
 - Spilotekali, iz se imprir po i di impri i i majiri nadrojni ndrade majiri i je je avrijet tih direktira deskasa.

Chapter 7 Cenery interaction

Chapter 7 Cenery interaction

Chapter 3 Cenery interactions and carrelle Diseases

Unit Three

Chapter 1

Chromosomes, and Genetic Information

By the end of this chapter, you Should be able to:

- Laplain the chromosome therapy
- Cranly the epiation anterior for chromosome and gene.
- Montile volat is meant by the leavestype to humans.
- Identity the maintain of chromisesones in some the ngarago ago;
- Compare toleroun the forestype or the make and terride injections.
- Exptain the meaning of the littlenge
- Identify what is mean by proserty over.

From a long time ago, man searches about how do generic traits transmit across the successive generations and the causes of similarities and differences in genetic traits.

At the beginning of the twentieth century, so entisis discovered that genetic information are carried on the chromosomes which lead to the appearance of traits in all living organisms.

The chromosomes are rocated inside the nucleus of each cell. They are found in homorogous pairs in the somatic dells.

The following figure illustrates the chromosomes in cells of humans pancreas and white blood cells.

Key terms

- e (lu sines che
- Unrally 4-years observed
- m 2 ,[]
- Promitted in
- Clossing nen

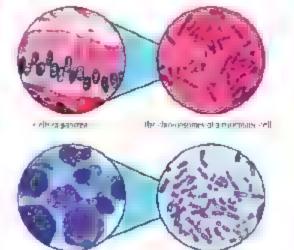


Figure (1): Different cells at if chromosomes

The changescene of a Wilde Hovel (A)

Karyotype

We can photograph the chromosomes when they are in the clearest form using the microscope, then be demarcated and classified into homologous pairs,

After that they arranged descendingly according to their size. To fact date carrying out of this task, chromosomes can be coloured with different colours.

The descending arrangement of chromosomes according to their size and numerating them are called the karyotype.

Enrichment

homologous pairs. Their number in cells of the living appairing characteristics for degree of its advancements or its size.

The following figures i lustrate the karyotype of both the human male and fenta e

Observe and identify



Jugare. 2); Karyatype of a human matel



Figure 10: Karyestype of a human female,

- How many pairs of chromosomes in both Karyutypes of the male and female?
- What is the difference between the karyotype of both the male and female?

Number of chromosomes

The number of chromosomes in living organisms differs from a species to another but it is constant in the individuals of the same species. Sumation (body cells contain two sets of homologieus chromosomes long of them is inherited from father and the other Long nother. These elegand ovalare temale ones, contain half of the chromosomes number wound in the sumation of such are happing cells in For example, the nucleus of each at man somation cells, i.e. they are happing cells in For example, the nucleus of each at man somation cells in the speciment female one the ovum contains 23 chromosomes only.

- Chromosomes are descendingly arranged in homologous pairs according to their size from number. To be number. 23. The pairs from number it to number. 22 are called sometic chromosomes, while the pair number 23 represents the sex chromosomes. This pair is not subject in this arrangement where it comes after the seventh pair in size, but it is arranged at the end of chromosomes and given the number. 23 i.
- The karyotype of male differs from that of the female in the pair of sex chromosomes. This pair is asymmetric (heterzygous) in male (XY) (Fig. 4) and symmetric (homozygous) in the female (XX, (Fig. 4) and called the pair of sex chromosomes because 1, carries the genetic information of sex determination.
- The constancy of the chromosomal number in both the males and females of all members the human race indicates that chromosomes carry the genetic information which determine the characters of humans and other living organisms.



Figure 4): The sea divernoscenes pair

* The following table represents the chromosomal number in cells of some fiving organisms

Table(1) The chromosomal number in ce is of some living organisms.

	Constitution of Constitution		
Human	46	Gori la	48
Hen	32	Wheat Plant	4,2
Cat	38	Onton plant	16
Vinegar Liy	8	Sweet potato plant	48
Dog	78	Pea plant	14
Tobacco plant	48	Frog	26

What can be concluded from this table?

Chromosomal Theory

By 1902, the two screens is **Suiton and Boych** had reached to the priciples of chromosome theory which can be crystalized in the following main points:

- Chromosomes are tound in the somatic cells as homologous pairs (2n).
- Sexical signmetes) contain the nart of a reprocessing number (n) due to melosis where the pairs of homologous chromosomes are segregated into two equal sels of chromosomes.
- Each pair of chroniosomes behave independently at its transmission in gametes.
- During fertilization the diploid number of chromosomes returns again.
- Genes are located on the obromesomes air the stugler bromosome may larry hundreds of genes.

Chromosomes and genes

The risemosume is composed of the outlets acid DNA and protein. DNA molecule cames the genes responsible for the genetic trads in Lying organisms.

You have learned that DNA consists of building units called nucleotides. The gene consists of a sequence of nucleotides that represents a code of a protein responsible for the appearance of a certain trait.

Interpretation of Mendel's laws according to the chromosome theory.

The opposite figure illustrates the inheritance of a poir of alielomorphic (contrasting) characteristics in pea plant

- What is your expranation for the appearance of the purple colour only in the first generation plants?
- What is your explanation for the appearance of the two colours in plants of the second generation?
- In the melotic division, the genes carried on the chromosome pairs are segregated into the gametes, and during (ertilization the chromosomes return back again in pairs.



Enrichment

Scientisis found that there

arc 6 > 80 thousands genes.

carried on twenty three

pairs of chromosomes in

humans. The complete set of genes in known as the

human genome

Figure (5) Law of genetic factors segretation

The dominant trait appears in the birst generation in a percentage 100%. The
dominant and recessive its appear together in the second generation in a ratio.
 3:1, respectively.

 The opposite figure explains the inheritance of two pairs of the characteristics studied by Mendel in his experiments, such as: the colour and shape of seeds in pea plants.

The yellow colour gene (Y) of seeds is dominant on the green colour gene (y), and the smooth shape gene (S) of seeds dom ates over the winkled shape gene (s)

- Are the genes of seeds colour and that of seeds shape located on the same chromosome or on two different chromosomes?
- What are the possiblines of genesiassortment into the gametes?
- What are the ratios of the appearance of the two characte stics in members of both the first and second generations?
- The assortment of genes carried on the chromosomes in gametes is independent because each gene is located on a separate chromosome.
- The individuals of the first generation carry the two dominant characteristics (the yellow colour and smooth shape) in a percentage 100%.

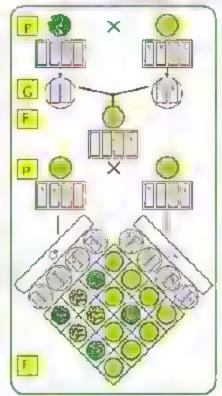
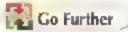


Figure (b. Law of independent assistment or gainst

The ratio is 9:3:3:1 in the individuals of second generation.



For more knowledge about this topic if you can refer to the Egypt an Knowledge is Bank (EKB) through the opposite link



Unit Three

Activites and Excersises

Chapter 1

Chromosomes and genetic information





Model of a karyotype

Safety precautions



Activity goa

Also igli gichite codines to term a laris of que

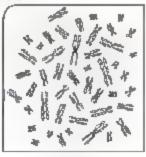
Acquired skills

Designing Innovation synciding, Classifying

Materials needed

Paper scissors wany adhesive Runnig fame

photograph and magnify a group of chromosomes using Ligure (1)



- [2] use the scissors to get cuttings of different chromosomes.
- 3] so the waxy arthesive to paste chromosomes on a white paper by arranging hem descendingly in identical homologias pairs according in the disize lasn figure (c)





- Under each chromosomes pair write the number that indicates its order
- How many pair of chromosomes you arranged?

Examine the karyotype in figure (c)—then answer the following questions:

- Does this figure represent a karyotype for a somatic cell or a sex cell? Why?
- F How many chromosomes in figure c)?
- What is the sex of the owner of this karyotype? Why?

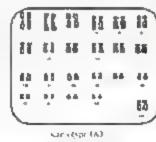
Assessment activity

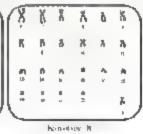
- The opposite figure | Listrates the karyotype of a cell
- Does the karyotype represent a sor ratio cell or a sex cell ? Why?
- Does it represent a cell of a male or a female?

 Why?
- How many autosomes ? and how many sex chromosomes(



- Check the figure opposite.
- Which of the 2 garyotypes represents a somatic celi? Which of them represents a sex-cell? Why?





- Does karyotype (A) represent a cell of a male or a female ?

 Why
- How many autosomes? And how many sex chromosomes are there in both karyotype (A) and karyotype B. ?



By the end of this chapter, you should be able to:

- Demonstrate the effect of games elecation
- Medion the mean of lack of documence
- Explain the tack of dominance
- Explain the constementary genes.
 Explain the wihaligenes.
- Explains the influentance of blood groups in hustain.
 Show the times or chostrying aloued into four groups.
- quosg boold a virineb
- Compare the four blood groups.
 Explain how thesin sector of inherites.
 Analy inherital is, or some up to on groups for.
- If an Property of the secondary of a section of the second of section of se

Key Terms

- Complete dominante.
- párjeká (kathlaya) v
- Complementary genes
- e leihal genes
- Blood groups
- Attiquers
- Ann 44 24
- Rhesus factor: Xb

Gregor Mendel arrived to that each trait is controued by one pair of genes, one of hem is dominant while the other is recessive. Later, scientists found that several traits were not inherited according to Menel's laws and called non-mendelian characteristics. They include cases in which the emergence of gentic traits is affected by the interaction of the affelomorphic genes.

 Examples of gene interaction are: lake of dum nance, complementary genes and lethal gene

Remen ber-

- Each pair of alterrolive character is called a elementative characters.
- In case of Mendelian chracter, when crossing occurs between to pure homozygous) individuals, one of them having the dominant chracter and the other having the recessive one, the individuals of the first files generation will a show the dominant chracter. While the tow chracters, the dominant and recessive, appear together in ratio 3.1, respectively, in the second filed generation. This genetic pattern is called the complete dominance.

Lack of Dominance

In Antirchinum plant, the flowers are chracterized by three colours: red, white and purple. The following figure illustrates crossing of a plant with red (lowers RR) with another plant with white flowers. WW).

What is the flower colour of the first generation plants?

- What are the possible genotype of first generation adviduals?
- When first generation plants are selfpolinated and their seeds are cultivated,
 What are the possibilities of the flowers colour inheritance in plants of second generation?
- What is the ratio of the flowers colour in plants of second generation
- Do these results agree with Menders awa?

The gentic analysis (fig.7) ill astrates that the flowers colour chracter is controlled by a pair of genes, no one of them dominates over the other. This happens due to the gene interaction where each one of these allelomorphic genes has an effect in the appearance of the new chracter.

 Notice that the phenotype indicates the genotype in case of ack of dominance.

But breeze by H. Saveta Again grand from the breeze by the saveta by the

Figure (7): Inheritance of flowers colour in interior and in anti-

Inheritance of blood groups in humans:



For more knowledge about his topic syou can refer to the Egyptian Knowledge Bank (EKB through the opposite link.



Genetic classification of blood groups:

Blood groups include three patterns in heredity, they are:

Multiple alfels: Blood groups trait is carried by three a lefomorphic genes: A,B and O. The individual has only one pair of them.

** Complete dominance: Both genes (A) and (B) dominate over the gene (O...

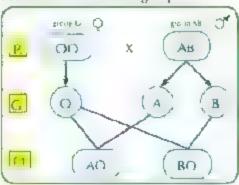
Table .2). Block groups and their generypes

Canyp	цепс	otype
	AA	AO
8	38	Ht a_
AP	3,	н
0	0	n

Lack of dominance: There is don. Thinkly between gene tA and gene B. They participate together in production of a new tract which is AB blood group.

The opposite diagram shows mating of a man has blood group (AB) and a WOF ALE(O)

- What are the expected blood groups of otispring?
- What is the ratio or blood group. among offspring?
- Are there possibilities of other blood groups?



game of Constitute down is described. inher Minne

Table (3): A rable shows blood groups

fhe	An gers	Antilana Ses
group		
A	A	ant-b
1	В	not a
۸.,	A and B	
_		तम्: -श
1,7		वता क

Chemical classification of blood groups:

Classification of blood groups into four groups A). (B), (AB) and (O) depends upon two types of substances. found in blood. Thes substances are divided into two typest

Intreens.

They are the substances that found on the surface of red blood cells. They are two types: antigen (A) and antigen (B

An abodies:

These substances are antithetic to antigens and found in blood plasma. They are two types: (anti - a) and (anti - a).

> Use it lett to compare between the tour blood groups.

1. feapple met

A dispute took place between two men about the eligibly of each in the parenty. of a baby has the blood group (O). The smoot group or both men was O and blood group of the first man wife was A while the blood group of the cecond man was (AB).

Importance of blood groups ;



Dispute resolution in determining

palernity and enroll ment children to their real parents in cord groups can deriving but can not pove the pareytage).



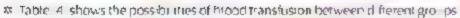
Determining the princesses of blocki translas on arming a clivic bals.

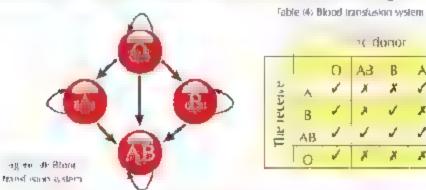


Used in studies of human race taxon my and studying evolution

Blood transfusion processes:

Bloom can be transitised between different groups according to a specific system. due to the presence of antigens and antibodies.





- What is the blood group that is called universal receiver? Why?
- What is the blood group that is called universal donor? Why?

The following table summarizes some information of the four blood groups. fable (5 - Blood groups

Group	Genetic	structure	Antigens	Antibodies	Donates to	Receives from
٨	٨٨	AO	٨	ant. b	A and AB	A and O
Ð	BB	BO	В	and-a	B and AB	Barce
AR		48	A and B	** **	AB	A I groups
C		00		ante o l'ante a	A I groups	0

Determination of the type of a blood group:

Each group of blood has certain artigens and their corresponding ant bodies. For example:

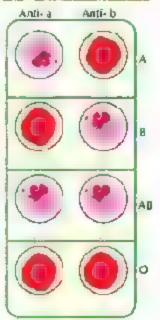
The antigens (A) are agg utinated with antibodies a).

Through the reactions that take place between antigens and antibudies and occurrence of blood agglutination, the type of a blood group can be determined

Procedure of blood group type determination:

To determine the blood group, both types of ant bodies. anti-a and anti-b, are needed:

- A blood sample is drawn from the person to be determining his blood group. Then two drops of blood are placed on thean glass slide.
- We put anti-a on a drop of them and anti-b on the other drop.



re donor

£Α

В

Х

Figure to Direct group determ a salima.



The result: There are four possibilities, which are:

Table (6): Determination of blood games

	First blood drop with anti-a	Secund blood drop with anti-b	The possible blood group
_1	Apply the on ++	No agglumation (-	A
2	No agglutination)	Applish nation (+	В
3	Адды па эв «	Agglatinalism	AB
4	No aggiutination (-)	No agglouration (-)	0

Discuss your classmates and your teacher the results in this table

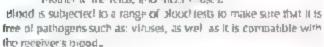
-Life application-

Resks of blood transfusion

There are some risks related to blood translation due the reciver exposed to:

When an incompositive blood with his blood group is transfused to him. This includes symtoms such shiver, headache, chest pains, breath lessness, blueness, tachycardia, hypotension and otten ends with death.

A viral infection can be transferred to the receiver as hepatitis.
 C which its infection takes place by blood transferred only since it does not transferred among couples or from the mother in the fetus, and AIDS viruses.





Bined panelision

Rhesus factor Rh3

Reside the antigens of blood groups here is norther type or intigens on the surface or recipilotric of is known as Rhesustal toruntigens. These antigens are found in blood of a most B¹⁰s or human heings who are known as positive Rhesus factor, and symbolical as R₂ at W₂ let the persons who have no his type or antigens in the office and it consent about 15.5% of human beings are known as positive Rhesus factor, and symbolic with (Rhr).

The inheritance of Rhesus factor antigens is controlled by three pairs of genes, located on a pair of chromosomes.

The presence of any gene or more of these three gene pairs in the dominal statue leads to the formation of rhesus factor antigens, and the person becomes positive Rhesus factor (Rh.), whereas all genes of the negative Rhesus factor individual (Rh.) are recessive.



Figure (*1): A red blood

Importance of Rhesus factor

Rhosus factor determination should not be neglected before blood transfusion as were as before mamage to avoid risks anding from the formation of not be tibbodies for Rhesus factor antigens that cause disintegration in fred blood cells.

Role of Rhesus factor in pregnancy and delivery:

If a (Rh.) man is married to Rh.) woman, and the retus inside the uterus was (Rh.) in portion of fetus blood mixes with his mothers blood at delivery. This stimulates her immune system to produce antibodies against antigens of Rhesus factor and these antibodies remain to mother's blood.

If the mother carried (Rh.) fetus, the antibodies formed from the first pregnancy move from mother's blood to blood of fetus through placental fig. 12). These antibodies cause the disintegration of red blood cells infecting the letus with sever anaemia that may lead to his death

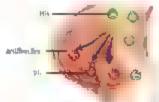
The preventive measure that we can do in case of discovering this difference before the delivery of the first baby is the imection of mother with a protective serum through 72 hours after each birth to protect the future baby.

This securit distributes the blood containing (Rhilhat leaked from blood of letus to mother's blood before enhancing matters or mane system to form antiburities.

Enrichment

Rhests actor artigens were first discoveres in 1947 with resembles were carried that on aloud of a kind of monkeys called Rhesus probless.

Therefore, these ant gens were given the name of Rhesus factor.



Injury Transfer ny ot intrades from other house to be alsoed of secures texas brough mothers placents

Complementary Genes

Complementary genes are the genes that can often work together to emerge a specific trait, where the inheritance of this trait, is controlled by 2 pairs of genes. The emergence of the dominant character depends on the presence of a dominant gene at least in each pair. While, absence of any pair of





Figure 13 Pea flower plant

dominant genes or both, will lead to if sappearouce of the dominant character and the recessive allelomorphic character appears.

An example of complementary genes is the inheritance of the flower colour character of pea flower shart. The pink colour represents the dominant trail while the white colour represents the recessive one, fig. 13.

The character of flower colour in periplant is carried by two different pairs of dominant genes and so of flexiby the two letiers A and B , w flexibly recessive genes are symboled by a and b

The opposite figure shows the crossing of 2 stains of pea flower plants, each of them carnes white coloured flowers.

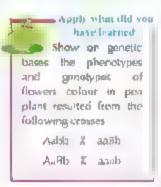
- What is the flowers colour of first generation plants?
- What are the possible genotypes of individuals of this generation?
- When self pollmation was carried between the first generation plants, then their seed were cultivated what are the possibilities of the flower colour character oper tance in second generation plants?
- What is the ratio of emergence of flower colour in second generation plants?
- A Write down the different genotypes for each of the pink flowers and write ones.
- Are these results in agreement with Mendels second law (Law of independent assortment)?

We to the one . die die Nas P AA bh aa 88 Ab aB G Aa Bh ik il nee Plak total P A, Bb Aa Bb Cart to ds AB Ab aP. ab AB AA BB AA Bb Aa BB Aa Bb Ab AA Bb AA 11 Aa Bb Aa bb aB Aa 00 Aa Bb aa 08 aa Bb Aa Bb Aa bb aa Bb aa bb Pink flowers White flowers 7

> Figure (14) , Infrestance of flower calour in pea plants.

When white flowered pea plants were crossed together all the flowers of the first generation plants appeared pink (in a ratio 100%). In the second generation, the flower produced were pink and white in a ratio 9. 7, respectively.

The appearance of princeolour (dominant character) in flowers of pea plants depends on gathering a dominant gene from each pair or more, because both of the two dominant genes participate to produce the pink colour of flowers where each of them controls the production of a specific enzyme that affect the formation of pink



colour. This inducates the collipiente it of aution or genesi, where in this case the dominan character can be obtained from two parents, each carried the recessive character.

The ratio of the second generation in case of Mendelian characters, aw of segregation of facture, $s \in [3,3]$. It, while the ratio of segond generation in non-Mendelian characters (complementary genes) is 9.7.

Lethal Genes

Some genes when present in a homologous condition, pure leause harms to the living organism resulting in disruption of some vital processes, earling to the deathof organism at different stages of life.

These genes are called the lethal genes. There are two types or these genes. which are:



O the name eithal genes i such as yellow fur colour in mice and building strain in. cat les.



Recessive fethal genes i such as absence of thiorophyll in corn plants and infantile dementia in humans.

Inheritance of fur colour of mice:

The opposite figure shows matting of a male and a female mice. Each of them has a heterozygous yellow fur and the ratio of the resulted generation was 2-1.

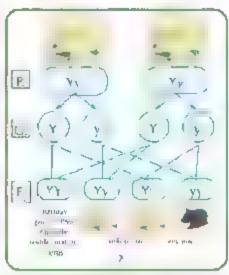
- What is fur colour of the resulted. generation?
- What are the possible genotypes of individuals of this generations?
- Why do these results disagree with Membel's first law (law of segregation of factors: 7
- What is percentage of ioss of mice. first generation?

The death of pure yellow mice is attributed to presence of a pair of dominant genes in a homozygous state causing death. of mice inside mother's uterus. These dead

mice represent about 25% of individuals of the resulted generation. The inheritance of this disease. takes place through heterozygous parents

In criting the absence of elilocophy lancorn ola its:

It was observed that when some corn plants were self poil mated and their seeds were cultivated. some seedlings free of chlarophy L white coloured. were shortly grown then will and die.



eignes 5 inventions of the forms 155 CD



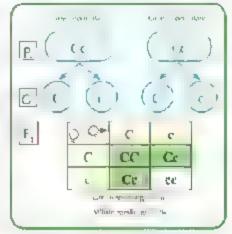
ip come valants thous a genetic lise se known as nightile demontia causes death when its genes are Nicosalvie (aa

What is result when a man is mail or lola women lear hios ment is held alvigous in respect to this tratt?

Study the opposite genetic analysis, then answer the following questions:

- What is the ratio of chlorophyll free seedlings among plants of the resulted generation?
- What is your justification for wilting and death of these seedings?
- From your point of view how can losing of plants be avoided and obtaining all seedings green?

The convergence of the two recessive genes together in some corn seed ings leads to prevention of chiorophyll formation. Chiorophyli substance acquires plants their characteristic green colour, as well as it is responsible for absorbing light energy for performing photosynthesis process.



Eigune (11), Inheritance of chicrophyll o

Effect of environmental conditions on action of some genes

At my people the girl that the action of genes is installected by an other actors. But recent researches has proven that the action of some genes is affected by the factors surrounding the organism such as a ripullulants i oxygen demency exposure to rays in addition to the environmental factors such as light and temperature. Similarly case factors affecting the actions in genes below in avoiding risks that may arise from these factors.

Effect of the absonce of light on appearance of choroptyl) character in green plants;

Germinate a group of wheat or bean seeds in a dark moon, and other similar group in a luminous place. Irrigate the seedlings to both groups regularly for several days.

 What is the colour of seedings in both groups?

The gene responsible for chlorophy I formation in green plants needs to the factor of light to show its



Figure (17). Effect of light on the colour of wheat spedling's.

effect. While in absence of this gener, the plantic annot produce chlorophy leven if it was placed in light

Unit Three

Coapter 2

Genes interactions

Processed activity

Effect of light on chlorophyll appearance in green plants

Safety precautions



Activity goal

conducing the rife. In high not the applications are replant.

Acquired skills

Observing, Comparing, Recording and Analyzing clate, Completing

Materials needed.

Agentality is set to the Hostices constitues come or whent guino , and water

Procedure: -

- germinate a group of wheal or corrigination aidark place and on identical group in Huminant place Imigate the seedlings regularly for several days.
- O iscruption.
- Record your observations about the colour of seedlings in both groups.

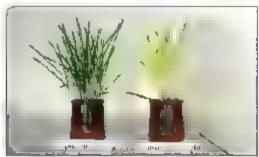
First group

Second group _____

Is there a relationship between the presence of light and appearance of green colour in seedlings?

Explanations

What is the explanation of this relationship?



trace of globarece meabour statues are ugs

ii Conc asion

- What do you conclude from this activity?
- Give some examples ensure that appearance of traits is affected by the environmental factors

Assessment activity.

The following table shows the resulted generation from crossing of listra os os oca piant. Answer the following questions:

0	AB	_	аВ	ab
	3	AARO		AuBb
Alte	(4)	AAbb	(3)	Aabb

- What are the genotypes of plants no. 1, 2, 3, and 4?
- Inter the phenotypes of parents
- What is the percentage of white flowered is anti-resulted from this crossing?
- The following table shows the four blood groups
- Write the genotypes of the following blood groups.
- Group A : " "
- Group B).
- . Write down the types of antibodies in weir proper places inside the table
- We to down the types of antigens in the inproper places inside the table.

The group	•	•		
Antibodies	412142-+	ы шп .	बर्क्ड -व	
Antigem				A

Examine the opposite table groups detection, then answer the

delign of designs, they suswer the

- iclentify the expected blood group in each case indicated in the table
- What is blood group that contains both types of antigens?
- What is blood group that donates blood to a liother blood groups?
- if your blood group is (A) and you need to blood transfusion, what are the proper blood groups for you? why?

Blood group	anti-a	anti-b
		()

Unit Three Chapter 3

Genetic-Inheritance, and Genetic Diseases

By the end of this chapter, you Should be able to:

- bulla interescent northwise In sex determination at the tetus.
- Distinguish between anme abonimal chromosomal cases to harmons
- Mention nonly sepalinably sate-Influenced and sequential trains
- Analyze some sex linked and you InBusiness math, an genetic bases
- State know methods used to precord the likelihood of genetal doordroy ecconing in sifepoing
- Appreciate the Importance of medica ecominations between mannage in abodd the penedic Cashiana.

Key terms

- Kilheleller i Syndrame
- Turner a Syndrome
- Joseph s "variationne
- Sele inked trains
- New Influence of Budge
- Sex similarly palls.
- Collage Withhouse Flemophila
- Baiciness
- Albunista
- Polic sides
- Centric firmily tree

Sex determination remains a dream for many people a long time ago. The dea that the woman is responsible for determination of her fetus sex, male or remale, remained untile the middle of the last century. By discovering sex chromosomes, scientists decided that man is responsible for determining of the sex of tehus.

How can you explain that the man 5 responsible for sex determination of the fetus?

Sex determination in humans

there are 23 pairs of chromosomes in each humanice. rese chromosomes are classified into 2 ypes:



Autosomes (Somatic chromosomes): their number is 22 pairs. They are similar in both the male and



Sex chromosomes: their number is one pair only and they are different in the male and female (Figure 18)



Figure 185 The sex chromosomes-

Female cells, contain 22 pairs of autosomes, and an identical pair of sex chromosomes (44 + XX).

- * Male cells contain 23 pairs of autosomes and one different pair of sex chromosomes (44 + XY).
- The chromosome (X, ditters from chromosome (Y) in size and type of genes each carnes.
- The opposite genetic analysis dustrates the possibilities of glving birth of males and females.
 - What is the possible chromosomal structure for both of sperms and ova?
 - What is the ratio of mates to remakes?

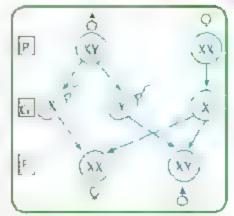


Figure (+9). The possibilities of embryo formation.

- The male and female gametes are formed
 by merotic division of cells of gonads itestes in males and overries in remaies therefore gametes contain half of their bromosoma number found in somaticice is.
- The mole produces two types of gametes at equal rarios, sperms carry the chromosome (X) and other sperms carry the chromosome (Y). The female produces one type of ovaitality the chromosome (X)
- When the ovum (22 + X) is fertilized by a sperm (22 + X), a female embryo will be produced.
- When the ovum .22 + X) is ferrilized by a sperm (22 + Y), a male embryo will be produced.
- Speras determine the sex of the embryon aut the ova.
- The genes carried or the two coronosomes X and Y had responsible for sex determination work at the first months of pregnancy.

Enrichment

In some animals, sex is descrimed according to the environmental conditions. For example, temperature that the eggs of totales are asposed to, plays a role in ses-dotermination the eggs ocated near soft surface with higher emperature, batch temperature batch temperature batch temperature that the eggs away from the softer of an exit with notern representative on claim makes at anothing.

- After 6 weeks of the beginning of pregnancy, the fetus which carries the
 chromosome (Y) begins in production of homones stimulate the tissues of
 garads which are unifferentiated to from the 2 testes, then he rest of male
 gentta organs are differentiated.
- After 12 weeks of beginning of pregnancy, the fetus which does not carry observoisome. Yi begins in the format op of the 2 ovaries, then the rest of female genital organs are differentiated.

Abnormal chromosomal cases in humans

These abnormal cases take place due to errors in gametes termation. This leads to the formation of abnormal individuals as a result of a reduction or an increase in the number of sex chromosomes or autosomes.

* Examples of abnormal chromosomal cases:

Klinefelter's syndrome:

=n 1942. Dr. Henery Klinetelter had discovered this case. Ki-nefelter's syndrome. (44 – XXV lakes place due to the ferbuzation of an abnormal ovum (22 – XX) by a sperm (22 + Y).

The presence of an extra (X) chromosome leads to a disturbance in body hormones where the genesic arried or the chromosome. A) express in some way from the symptoms of this case:

A sterne male due it absence of the sperin generating cells, and appearance of some terres nei-characteristics such as: growth of the breasts in size, tabless.





Figure (20) Karyotype of Uneleter's syndrome.

Figure 311. Naryotype of tumer's syndrome.

Observe the difference of the chromosomal number in each case

Turner's syndrume:

Turner's syndrome (44+XO) occurs due to the fusion between an abnormal gamete (22 + O) by a normal one (22+X). The lacking of chromosome (X) which carries genes of on- sexual characteristics produces a female with several deformities.

From the symptoms of this case:

shortness, does not reach puberty due to lack of sufficient amount of hormones, and presence of some congenital defects in heart and kidneys.



Figure 22 a Tomer's syndrome

Down's syndrome



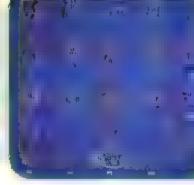


Figure (23): Down's syndrome

Figure (34) the laryotype of Down's syndrome.

OBSERVE THE EXTRA CHROMOSOME NUMBER (21).

The child shown in figure (23) suffers from a case called Down's syndrome.

- Describe the shape of his face and eyes.
 - Examine the karyotype in figure 24 which represents the **Down's syndroms** then answer the following questions:
- How many chromosomes in this karyotype?
- What is the number of the abnormal pairs of chromosomes? What is its typic!
- Is this karyotype for male or female! Why?
- Is the emergence or this case is limited to a particular sex over the other? Live reasons
- In 1866, the British doctor Down had discovered this case. It results due to the fertilization of an abnormal gamete (a sperm or an ayum) carries the pair of chromosomes no. 21, so a child carries three copies of the chromosomes no.21 in his body cells. It is an autosome. The child may be male (45 + XY) or temale (45 + XX).

From the symptoms of this case:

A retarded growth, shortness, ovar lace, flat back of the head, fingers and toes are short, small ears, convex eyes, and mental retardation

Sex-Linked Traits

Scientists a scovered that the genes of some purity clurar terfish is mimary animals are located on sex cinomosomes. X and Y and called sex, tinked characteristics.

Thomas morgan is the first scientist discovered the sex- linked genes during studying the eye X^RX^R colour chacter in *Drosophia* insect. He crossed white X^rY eved males *Drosophia* whit red-eyed temales he tollowing figure. Justrates the crossing of a white-eyed male *Drosophila* with red-eyed temale for 2 successive generation:

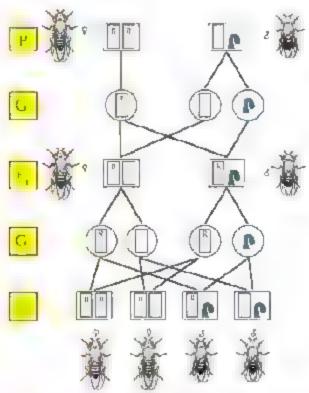


Figure (25): Inheritance of eve colour characteristic in Diosophile insects.

- What is the rario or appearane of eye colour characteristic between the males and remaies of first generation?
- What is the ratio of appearance of eye colour characteristic between the males and remaies of second generation?
- A What is the sex of insects with white eyes among the members of second general on?
- Does this case agree with Mendel's first law (segregation of genetic factors.)

Morgan noticed that when white eyed males *Drosophila* were crossed with received temales, the members of first generation were red-eyed. This means that the red eyes characteristic is dominant over the white eyes one. When interribers of first generation were crossed with each other red-eyed and white-eyed insects appeared in a ratio of \$100 respectively. It was possible 10 consider this case as a Mendelian characteristic unless his observation that all white-eyed insects were males.

Morgan explained that these genes are carried on the sex chromosome (X whereas the chromosome in Carries few genes only. He gave his case he name sex linked characteristics. Therefore, Morgan considered that the eye colour of Drosophila insects is a sex-linked characteristic.

Enrichment

Sex-linked characteristics in humans

In humans, the chromosome (X) carries the genes that responsible for some body character stics such as, hemophical colour blindness, short sighteoness and muscle atrophy. The tather passes the genes of these staits to his daughters, but not rolling some

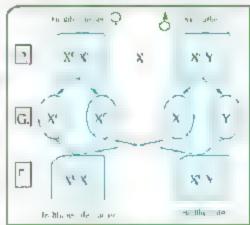
Colour blindness

the condition of octour blindness is caused by a recessive gene carried on the chromosome. A. This gene causes he mah, ity to distinguish the colours especially the red and green ones.

The opposite genetic analysis shows the inheritance of colour blindness trait

- Why is colour blindness bai represented by a single gene in majes?
- What are the possibilities of this trail inheritance among the male and female offspring?
- Why does not father pass the colour bunchess trait to his sons?

The sex linked trait is represented by a single gene found only in males because the chromosome (Y) does not



to males only.

here are some genes an he biomosenic (vi or the normal

mate Thermate, electrosponding

genes on the chromosome to

herefore, the appearage of these

mills, such as the presence or

tair on eal margins is restricted

Eigure Loi, the liber waste of colour combess may or

carry colour pundness genes, and is represented by one pair of genes in the females due to the presence of a pair of sex chromosomes (XX)

- The maid does not pass his trait to his sons per ausc he passes the chromosome.
 (Y) not (X) to them.
- The mane passes his rait to his grandsons i rough his daughters, while the mother passes the trait to her sons and daughters.

Enrichment

The condition of mascle atrophy is caused by a see niced ethal recessive gene career on X caramosome. This condition is restricted only to the major and temales. It's symptoms appear at the age of twelve years.

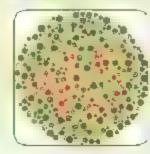
This cunding causes a gradual arrophy of proscles and healing a real possible it ends with deal.

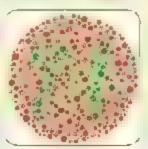
Test your eyes

Look at the following two figures:

What is the number in both the first and second circles?

Your success in reading the numbers correctly includes that you are real by rum colour blindness.





Haymophila:

Haemophilia is caused by a recessive gene carried on the chromosome. X) This gene causes a case of bland inquidity cale to be all cot some necessary surstances necessary for blond clotting. Haemophilia may cause death especially in the childhood stage.

Sex-Influenced Traits

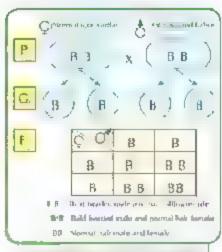
The genes of these trafts are located on the autosomes, not on the sex chromosomes. Sometimes the sex of the rung organism acts to modify the

dominancy of some traits, where the act of these genes are influenced by the male or female sex hormones, such as the presence of horis in cattels and baldiness in humans.

Baldness:

The opposite genetic analysis shows the inheritance of hair failing trait

- What are the possibilities of appearance of hair talking trait among the members of the resulted first generation?
- Is the ratio of hair falling train appearance is equal among the two sexes? Why?



no el 27 la net antre littrata dessinar

The haidness trait is attributed to the presence of a dominant gene responsible for hair tailing and affected call by the musculanty bermones. The phenotype of the hybrid genetic structure is different in male from that of temale. The balaness appears in maids in two cases, in the pure genotype, B, B, and the hybrid genotype BiBlidge to the effect of the miscrimity hormones. While, the hair tailing trait in ternal os appicars on y 11 the pure genorype B.B. The individuals with the generype (BB) in both sexes do not saffer from bair failing.



Ciencilio hair fall ing in See nedless



Cenetic datelines in moles

Figure (28 x The case of genetic baldness in humans

Sex-Limited Traits

There are some traits that are constructed to one sex only due to the differences in sex hormones of each sex. If eseigenes are esponsible or the appearance of some traits such as milk production which is smited to the females only, not males. The emales have cerain sex hormones help the gene to express its effect. Also, the secondary sexual characteristics in humans such as the beard in men, and also the ability of female birds to lavieges.

Medical examinations before marriage

Medical examination before marriage is a series of medical examinations carried for the persons who will ger married to be sore that they are tree from the medicules. diseases such as hepal is and AHES, as wer as generic diseases such as inalasemia.

These examinations are carried out to give the medical councer about the possibility of transities on or beseld seases to the paltner or io the offspring in the future. In addition, these examinations provide the choices or alternatives to who will get married in planning for a healthy family.

The marriage of relatives and proceeding without making the medical examinations are considered foctors of genetic diseases spreading out. Medical examinations before marriage help in



Giving birth healthy chudren



Avoiding the financial psychic, social leads when canny the children injected with genetic diseases.

Science, Technology and Society

Genetic fingerprint

Genetic fingerprint did not know until 1984. When sir Alect peffreys at university of eleester in London pupilished a research showed that the genetic material may repeat many times. After one year, he stated that these repetitive sequences are unique and chracteristic for each individual. They are imposible to be similar in towindividuals unless in the identical twins only DriAfec recorded the patent of his discovery in 1985. He named these repetitive sequences by the name the human DNA fingerprint. This fingerprint was known as "a mean used to identify individuals through comparing DNA sections (fragments,". Sometims, it is called "DNA typing".

The usage of genetic fingerprint started in the medicine. It was used in studying of genetic diseases, operations of tissues implantation and others. It is fastly introduced into field of "forensic medicine", where it was used in identifying the deformed carpses and tracing the missing children. Courts opened the files of crimes registered against unknown persons, and the interrogations opened once again. The genetic fingerprint exempted hundreds persons from killing and ravishment crimes,



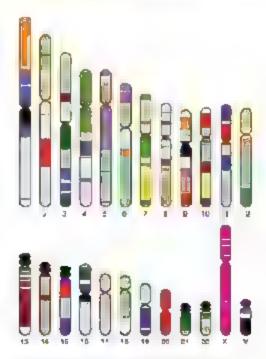
Driff carries the code of generic linguished

and incriminate others. It was the decisive word in the cases of ancestries.

Huntan genome

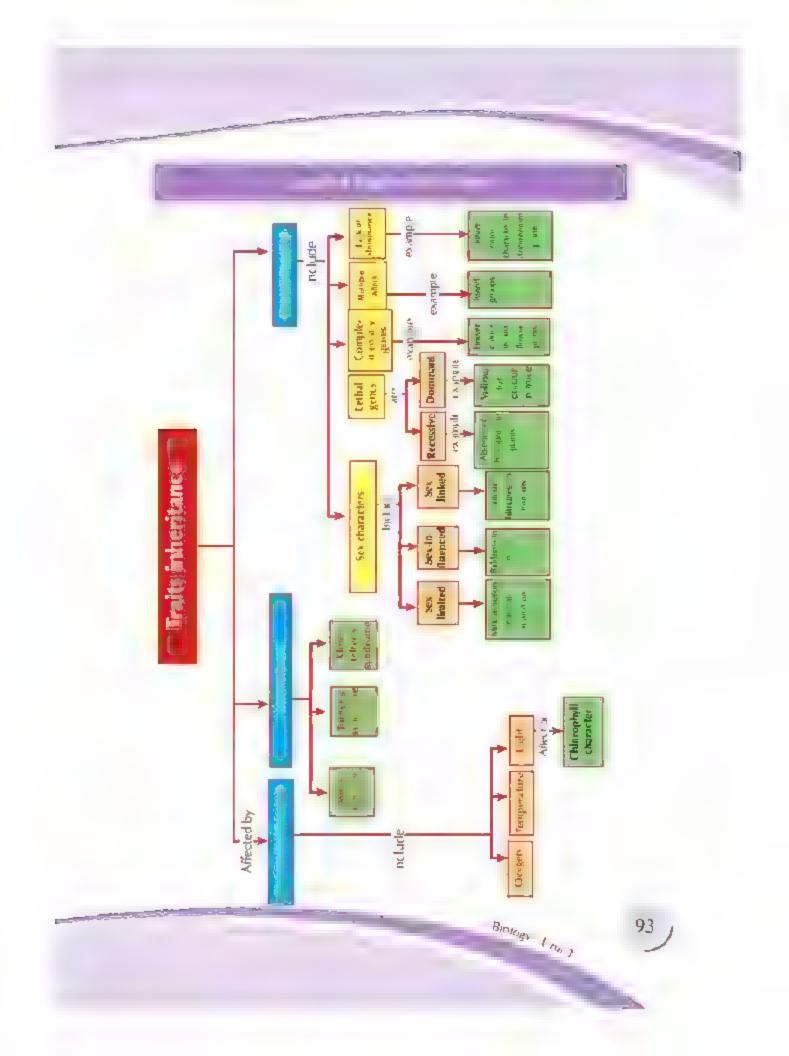
Human genome comprises all the genes found in the nucleus or each somalic cell. Their number is ranging nerween 60,000 and 80,000 genes. They are located on 23 pairs of chromosomes. The genes participate in presence or the enormals number of human characteristics. The search for genes started in 1953 when the 2 scientists Watson and Chuckproved that the gene is a double helix of the nucleic clacid DNA. In 1980, the idea of genes appeared and the number of genes identified by a relists was about 450 genes. At the middle or eighties. This is, tiber is that filed three times over to reach 1500 genes. The aim of scientists was the drawing of a good genetic map through the accurate identification of the locations of genes on the chrom-womes. So the genes as is generic diseases can be indentified.

Now scientists a min hentilitrom the genome in the field of drugs and stry and reaching to drugs without side effects, and studying the evolution of living organisms by comparing human genome with other ones of the other living organisms. Also, they a mit o hired improvment through identitying the genes of diseases in the tetus before its delivery and act to improve them.



Chromosomes carry thousands of genes

- Lethal genes. The genes in accept to retardation of growth and cause death acdifferent stages of life when they are found in an identical form (pure).
- Antigens: Chemical substances found on the surface of red blood cells and determine the transfused blood group.
- Katvo ype: Classifying of chromasomes into homologous pairs arranged according to their size.
- Lack of dominance: A genetic case in which the gene does not dominate over the corresponding gene and they interact to produce a new trait.
- See-linked traits. Genes of these characteristics are carried on sexchromosomes, and their appearance does not affected by sex hormones.
- Sex-influenced trails. Genes of these characteristics are carried on autosumes and their appearance is affected by sex normones.
- Klinele ter s syndrome. An abrilla har case resulted que to the presence of an extra (X) chromosome in some males (XXY).
- Turner's syndrome: An abnormal case resulted due to lack of one (X chromosome in some females (XO))
- Down's syndrome. An abnormal case resulted due to presence of an extraautosome in the pair of chromosomes number (21).
- Rhesus factor: A type of antigens found on the surface of red blood cells in most humans. Three pairs of antigens located on the one enromosome pair control the production of rhesus antigens.

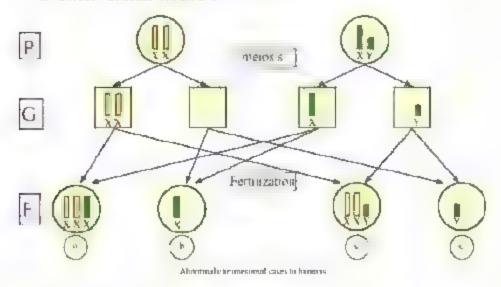


Assessment activity

Ahnormal ethomosomal cases in humans

Sometimes, during gamete formation by meros sithe sex chromosomes are not equally distributed due to their adhering closely to each other.

 The following figure shows the genetic analysis of some abnormal chromosomal cases in humans



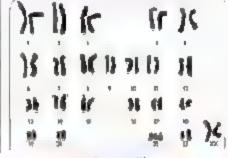
- s the error occurs during the formation of sperms or ovules?
- how the abnormal case XXX is produced?
- [3] What is the chromosomas shorture resided from lentilization of an abnormal ovum (22 + XX) by a healthy sperm (22 + Y)?

Assessment activity

Studying the karyotype:

1- Study the karyotypes (A) and (8), then record data in the following table





kurentype (A)

Катумура ВЧ

	Campungua -	- Improprie
Туре of еггот		
The name of case		
The sex		
Symptoms		

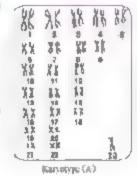
Examine the 2 toll owing karyotypes, then answer the tollowing questions

How many bromosomes karyotype (A)?

and karyotpe (B)?

Identify the sex of individual from the karyotype (A)

And karyotpe B).





- What is the name of the abnormal case that is reserred by both karyotypes. A, and 8%
- Mention the symptoms in both karyotypes (A) and (B).
- What is the cause of their occurrence

Unit three exercises

First question: Choose the correc	t answer:
	s i rossing et 2 individuals differ in a pair of ailelic
characters in case of lack of d	lominance is:
A. 3 1 B. 1.2.1	C. 9.7 D. 2.1
	th blood group or resulted from mating of a man-
with blood group (AB) and a	41-
A. 25% 8. 50%	C. 0 % D. 25%
The blood group that has the	two types of antigens is:
A. A B. B	C. AB D. O
🖪 f a parent has binod group Al	Bline can not give a chief with blood group
A B. 8	C. All- D. O
The flower colour character of	of pea plant represents a case of:
	ies C. Multiple genes Q. complementary genes
The inheritance of yellow con	our of paice represents a case of
	of dominance C. Lethal genes D. disex finked trait
	The state of the s
[7] The chromosomal structure of	
	E XXY D XO
	bon in cattle is an example of Iraits.
	enced C. Sex limited D. d Mendelian
	diume contes from enflization ut a heakity orani
by a sperm: A. 22 + XY B. 22 + Y	C. 23 + Y D. 23 + X
	a cutour blinded woman, this disease will appear
n of their offspring.	a Colom in fidea workin, this a sease will appear
A. All males 8. All females	C. Hadrof males D. Half or temples
Second question. Write the right's	sclentific term:
1. A group of office entigentes at	scaled on a circumosome and inherited together.
	[]
	he homozygo is state ead to the retaida on of
Brown and co readed to a t	most one fourth of the offspring at different stages

- A type of antigens found on surface of red blood cell, and cause abortion of the pregnant woman.
- Genetic state displayed in the form of a diagram that shows how a certain trait
 is inherited and benefits to follow up different trafts.
- The genes influenced by sex hormones and carried on autosomes. ()
- A abito toal case resulted from ertilization of an about hallovara (22 + XX by a sperm (22 + Y).
- An abnormal case resided from tertilization of an abnormal oxumi 22 + O by a sperm (22 + xy).
- An abnormal case originates due to presence of excess chromosome in the chromosome pair number 21

Third question: What would happen in the following cases.

- 1 A woman (Rh.) marned a man (Rh.) for their first and second babies.
- [2] Mating of yellow mice together.
- Transfus on blood from a person with blood group (AB) to mother person with group (A)
- Germinating seedlings of a complant in a dark place.
- ferturation of an ovum (23 + x) with a sperm (22 + x)

Fourth question. Give reasons.

- When 2 individuals differ in a pair of allefic traits, the ratio of second generation is 1 : 2 1, not 3:1.
- * Kimptelters syndrome affects males only white Timers syndrome affects females only.
- Down's syndrome affects males and females
- Colour brindness disease is more widespread among males, han temples.
- F Blood group AB is a universal receiver while allood group. Di is a universal donor

Fift guestion. Compare between each pair of the following.

- 1) Blood group (A) and blood group (B).
- Lethal genes and complementary genes.

South question: Explain the following cases on genetic bases.

- 1 A man with alook group. A married a woman with blood group (B), they gave both a child with blood group (O).
- A mother with blood group (Ab. has a son with the same gloup. What are the possible genotypes of the father without a genetic analysis?
- 3 What is the flowers colour of peal lower plants resulting from the to lowing crossing. AAbb KlaaBb?
- Crossing of an Antirih much plant comes recificive s with another one carries pink flowers.



No one knows now than y several kinds of living organisms on Earth's surface, in spite of human success in describing and naming about 1.4 million kinds of these types to linow, box ogists are thinking that this number is not representing more than 1% only of the living organisms on Earth's surface. There are millions of inserts small animals and plants that live in oceans which ale not yet discovered till now.

Due to the massive diversity in living creatures, the need to the classification process appeared. Scientista classify the living organism secon roting to the common features in order to make it easier to be studied in this anil, we are going to know the principles that biologists apply in classifying the living organisms and what are the main groups of this right creatures in the light or the modernic assistation. You will achieve the skill or classifying living organisms according to the cicharacteristics.

for more information about the topic of classifying theing organisms, log in the rel-



By the end of this unit, you should be able to.

- So one could be thought to specify
- was the to the state of the sta installed to a lighter of employee.
- · free over up into a touristate is it absolutes
- Figsign is institute house
- Explainment and material steel
- Dir. Da apres a smertume. The a aricle offers
- that performing to a fight the section Na tra the
- Aparama the dominion is all to the one different.
- क्षात्रक के क्षित्रक के अपने क्षात्रक के अपने क्षात्रक के किए कि प्रदेश के अपने क्षात्रक के अपने के अपने क्षात्रक के अपने क्षात्रक के अपने के अपने का अपने के अपने के अपने का अपने के अपने का अपने के अपने के अपने के अपने के अपने
- Explain extend on the same of the control of the same brediversity

Chapter 1. Principles of Living Organisms Classification Chapter 2: Modern Classification of Living Organisms, Chapter 3: Kingdom Animalia

Unit Four

Chapter 1

Principles of Classification of Living

Organisms



By the end of this chapter, you should be able to:

- Conclude some of the equification goods on them and
- Desine what is mean the species.
- Describe the way of ainmental numerolause or living argan session and a recognition
- Numerate the Goods of Geometric humaning of tolog organisms
- Lise and clesign the air hotomotic key
- Approvate actorises efforts on classifying and identifying flying coups says

Most of libraries contain thousands of books in different fields. When you visit any of these libraries to read a specified book, how can you find the book that you are searching for between these enormous numbers of books? Libraries to low a specified system to classify books and categorize them according to their fields, and in each field it divides into small categories with specified subjects and so on till they use numbers to place book on shelves.

By this system it can be easy to find a specific book in the library. We use classification system in our daily life, in addition to books. We classify food much nes and even television programs. Also, scientists use a system to classify living organisms, but how can scientists classify this huge numbers of several kinds or living organisms on Earth's surface!

What is the Importance of c assisteation?

Find the answer of this question through the following link in EKB



key terms

- X ziggine
- 'lı sər
- 111125
- re te-
- e arrub
- * 5U NY
- Become disconcernance system
- odnosamore pro-
- Lin milita disease ho

The classification of living organisms on solentific bases make it caster to identify new organisms, and to add them into their similar groups. Also, classification benefits many other fields of science.

The philosopher Aristotle (more than 2000 years applied on sidered as the first while cass feet animals impired blooded animals and bloodiess an mais. Also the classified plants into trees, shrubs and weeds.

The modern classification depended on the definition of the species as a scientific and basic principle in the classification of living organisms

What is meant by the species?

l igon

When mating takes place between a nonfemale and a tiger male, the tigor is produced ig. (). Tigons are sterile as they are unable to mate and reproduce:

Viule

Male is produced by mating of a male donkey and a femase horse. Mule is ster le and unable to mate and produce of new generation.

The term species does not given to tigon or mule because they are unable to mate and produce a new generation of the same kind.

The species: Is a group of individuals having similar morphological characteristics, mate with each other and produce fertile offsping similar to them.



Figure (1) Jigon



Figure 47 Ma

Naming of living organisms

here are often different names for the same organism in the various Earth's regions and enveronments. These names are called the common names

To overcome this problem, Linnaeus proposed a system for nomenclature of living organisms called the binomial system of comenclature written by latin language. In this system, each organism was given a binomial name. The first name represents the genus (begins with a capital letter), while the second name represent the species (begins with a small letter). It was agreed to write these names by tiked latin letters, or to underline each of them by a special line to make it different than others, for example, the scientific name of cat is felis domesticus. (Figure 3)

Enrichment:

Latin language was used to be a scientific language because its words has be of meanings.

in adultion, it is an old language and not spotter by people. This projects this language from any change of mudification

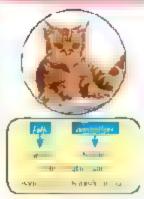


figure (3): The schoolific reason of the domestic car

Taxonomic hierarchy

There are 7 groups or levels for classifying living organisms. Each group

comprises less numbers of organisms, that have more similar characteristics than, that of the group preceding it. These groups are:



Kingdom:

Includes a number of phyla.



Phylam:

Includes a number of classes.



Class:

Includes a number of orders



Order:

Includes a mumber of families.



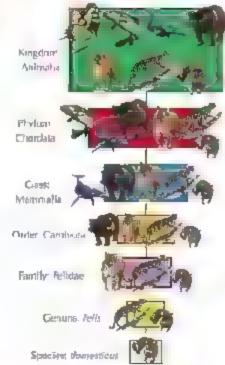
Family:

Includes a number of genera.



Genus:

Includes a number of species.



Reum (4): Cataffication of domestic cata



- Species is an interpreeding population of a gar sois that can produce healthy.
 fertile offspring
- In addition to the previously mentioned groups, there are other groups that intermediate each two successive groups, such as sub - phyllim, and sub - class.

Dichotomous key

What wiff you do to Know the species of a living organism you founded accidently?

You may be try to find it's picture in a book, but this way sometimes is not efficient, may be this organism have different on our from the picture, or even is not existing in the book.

Scientists often use the dichotomous key to help them in identifying living oran sins. Dicholomous key is a series of descriptions proceed in pairs, that leads to identify an unknown living oran ser. Dichot mous key is designed to start with broat leatures. Termiget no especificifiand more privacy when ever we got mough the levels of dichotomous key. Prough each siep, you can choose one of the two descriptions a cording to the character roots of the living organism. By the end you will reach to a description leads you into the organism's runner or the group which it is belonging to.

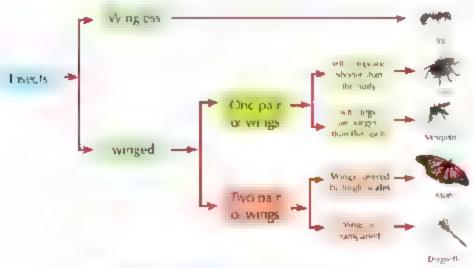


Figure (5): A bitalend dictionomous key for 5 species of insets

Unit Four

Chapter 2

Modern Classification of Living Organisms

By the end of this chapter, you should be able to:

- Explain none afferopts to clausty fiving organisms
- Explain the modern system of cusseffcation
- Explain the characteristic features of the five tongdom of living to a ms.
- Administracing to all entire preparations as an improve the Mattern, Profited , Funga and Planton linguisms.
- Elastify some being organisms in the light of modern classification.
- Appreciate televising ellipids in identifying and classifying by egurganishts.
- Approxiate the grandeer of Atlah in relative becamped a neighbors.

organisms in two kingdoms only: Animal kingdom and Plant kingdom. By the technological advances used in fleid of

traditional classification system that class fied living

n 1700, Carolus Linnaeus established the

By the technological advances used in fleid of biology and increasing of knowledge, the scientist Robert H. Whittaker (1969) established a new system of living organisms classification called the modern system of classification. In this system living organisms were classified into five lingdoms: Monera, Profista, Fugi. Plantae and An maka. It is the conventional system in the scientific communities. There are some organisms that are difficult to classify according to Whittaker classification. They include the viruses viroids and prions.

key terms

- Avgreni
- n deta
- Contract
- Tage te
- America
- Months and plants
- Yara tehn akaribe
- Erros
- Bitherbickmin
- Angiogiamia

(1) Kingdom Monera

King lain Moneta is charaterized by the fullowing characters.

- Unicellular organisms.
- It may live individually or in colonies.
- Cell wal is devoid from cell plose or pectin.
- Many cytopiasmic membranous organe les such as: mitochondria, Gofyi apparatus, endopiamic reticulum and plastides are lack.
- It does not contain a definit nucleus, where its genetic material is not externally surrounded with a nuclear membrane.
- Monerans are classified into two different groups.



tre includerers.

Most of them are often survive in harsh environmental conditions, such as a hot springs, ery connects with no payer and mittelly sally water. This group ditters from true becter a in the structure of both cell membrane and cell wall



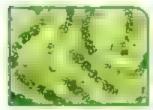
Enhacteria

This group includes many widery spread species.

They exist everywhere, in air on land and in water, Some of them are autotrophic such as availablatter a as Nostoc i while others are heterotrophic Bacieria reproduce asexually by altery his on. They have various forms where their shape may be spherical, rod - shaped or spiral (hg. ?).

Enrichment

Nanohacteria: They are very or sectional Theorems to those 20-700 ganometers, Scientis disagree in convolving them as about dline signed res a in new open of life. These furtiers grow stoody nearly living ce to and their hape change diring their stages of growth. They are more resistant than the normal bacteria. They man protect memselves from the defense systems of the body by secreting show sametch some artering if emas a capsule likesearchery reach hat his sone of traviers is a main cause in the formation in kidney stones, atheroscierosis and inflammation of the prostate



Enguire (h) Montoc



Figure . 7) Various forms of sacton-

(2) Kingdom: Protista

These organisms are eukaryotic. They differ of both plants and aninoais, where their structure is not complex. Some of them have a cell wall and plasticis

Protists are classified into several phyla, the most important ones are:



Phylum: Protozoa

They are unicel ular microscopic animal-like organisms, live in tresh and safty water, as well as in moist soils, they may live individually (solitary) or in colonies, some are neel lying alk of les parasitize plants and an mals, causing diseases, il ey reproduce both sexually and asexually.

Protezoa is a assisted into four classes depending on the mean or locomotion.

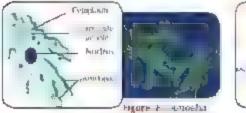
■ f fass * Spreading

They move by Temporary extensions from the budy called pseud ipoc all eight.

Amoeba (Fig. 8.)

· Class . Cil ophora

They move by cola surrounding the body , e.g. Parameclum , Fig 9).





Class: Flgetlata

They move by flagerial, e.g. *Trypanosoma* (Fig. 0) which parasitize humans and causes sleeping sickness.



(Figure +1.0): Frybathosoma

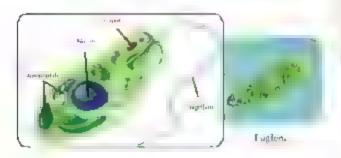
• Class: Sporozoa

They have no mean for locomotion. They produce phases called spores , e.g. *Plasmodium* which parasitizes human and infect him with malaria disease.



Phylum: Euglenophyta

This phylum comprises Euglena. They are unicellular living organisms contain green plastics and do photosynthesis. They move by flage la



Enrichment

Sleeping sicknesse This is one of widespread diseases of the tropical regions. This disease in transmitted by beine in transmitted by beine fly which transfers Trypansoma parasite by biting burnans. The infected person suffers from fewer, heavy tweat, headache, lendency to steep, halfuctuation and weak tess. Without treatment in proper time, the patient goes into come which leads to death.



Phylum: Chrysophyta

Most of them are unicollular algae called dilitims. Diatoms have glass like college to the source of the source of the distribution and other marine animals. Fig. 13.



Phylum: Pyrrophyta

These a gae form a great port on of phytopianklons live in seas and oceans. They arguire a red colour because they contain a red pigment beside the chlorophy pigment I authorities represent the largest group in this phylum. Its members move by two flagetiae. (Figure 12)



Figure : P Diatoms



Figure (12): Dingflaget ates

Enrichment

Red fide: Red fide is a natural phenomenon occurs in seas each occurs in seas each occurs in seas each occurs water is accompanied with death or thousands or fishes this phenomenon is attributed to the enormous increase in numbers of dimellage lates. When water occurs, water with plenty of nutrients, these opparisons repreduce very rapidly and secrete toxins will fishes.



(3) Kingdom: Fungi

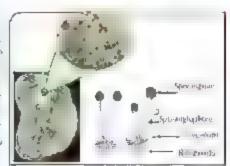
Fung are characterized by the following characters:

- Fung are beterotrophic organisms some are unicellular, and the most are multicellular.
- They are immuhile and have cell watis contain jegnin.
- They are consisted of filaments called hyphae, and collected together to form mycellium.
- They are heterotrophic, some are parasites and others are saprophytes.
- Most of Listin reproduce seven y as well as they reproduce asexualty by producing spores.

Fungulare consisted depending on their structure and ways of reproduction into live divisions , the most important ones are

Division Zygomic to

The hyphae are not divided, spores are workered uside sporangia. Learnple Miscopus arguouns breas mot ld which causes the black anti-faction or tread. At enzyme uses in threse are detry is exacted arm his sunges.



Герите (-3). В рень проміть Готоров

Division Occurryenta

Some are unuclible such as yeast tungus, and offers are multic diale, with hyphae divides spores eside sacrate structures called asci. Example Periodium fungus with hiproduces the antibiotic porticillan.



Figure 14' Examples of Ascomydola

Division Basidioany eita

Paris hyptage og divided ik septa. The rispures om proritier is de a cap-shaped structure i author musicolom stæne kind of tem aster a food for human.

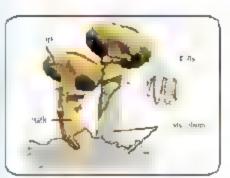


Figure (15) Mushroom tages

(4) Kingdom: Plantae

Plants are eukaryotic organisms, characterized by dellutose walls. Plant cells contain the chlorophy subsidince in structures called chiomphasads. Mos plants repreduce sexually.

Scientists classify plant kingdom into-

- a- Higher algae : they include the red brown, and green a gae
- b tyon vascular plants include bryophytes (mosses
- Vascular plants



Phylum: Rhodophyta

They are marine weeds sticking together by a gelatenous coat. The cells of these algae. contain chromatophores of red pigments, Example Polysiphonia (1.3.1-a).





Phylum : Phacophyta

Figure 16): Palysiphonia

They are marine weeds consist of simple or branched filaments. There are chromatophores of brown pigments in their cells Example Fucus (Fg. 17).



Phylum: Chlorophyta

These algae contain chioroplastids. Some are unicellular such as Chlamydomonas (fig 18) and others are multicel ular such as Spirogyra (IIg. 9). which has the form of unbranched filaments and its cells contain sprial - shaped ch proplasticis.



Figure (17) Fucus



Figure (18): Chiamydonenas



Figure (9): Spirogyra



Phylum: Bevophyla (Mosses)

This phylam includes the practs which do not contain specialized vascular tissues, so they are called not vas talant and. They are terrestrial plants that need clampness greatly to grow and reproduce. Therefore, they we in clamping so a and shaded places. They are small green in content and have certain hairs for anchorage with their effectives. Some are that such as *Riccia* and others are erect such as *Funana* (fig. 40).



Figure (20), Bryophyte plants



Phylum: Tracheophyta

This phy um comprises the plants which have special used vascular issues for transport of water and ponerals (through the xy emit and transport of organic schedules produced by photosy mess disputing hittoen, so they are carried vascular plants. This phylum is classified into three classes:

Class, Fibratae (Ferns)

These plants have simple structure. Most of them are herbs and few are shrubs or trees. They I ve in shaded damp regions, as well as the wall of wells and shaded damp valleys. They have stems, leaves and roots. Also, they carry pinnate leaves and do not produce flowers or seeds. They reproduce by the spores that found a special structures on the lower surface of leaves. Example: *Polypodium* (lig. 21), and Adiantum.



Figure (21 x A pironte leaf of Polypoolium

to Class Gymnwaermae or Conifers.

Most of them are trees and few are shrubs. They do not produce flowers. Thy carry male and female cones. They have naked seeds and needle - shaped simple leaves. Example *Pinus* (fig. 32).



Figure (22) Placs plant

Class: Angiospermae or Figureing plants.

They are terrestrial plants, have stems, leaves and roots; they produce flowers that convert into fruits enclosing seeds. These plants are classified into two groups: Monocotyledons and dicotyledons.



Figure (23): Fruit of Bowering plant (peacls

Use the following table that help you to identify the differences between the two major groups of flowering plants.

* Table (1): The taxonomic obara registras of orong orong address and directive does

	Seeds	Leaves	Flowers	Stem	Reat
Rogi annografyledom	5		**		¥
D coryledons	0		果	English Control	V

Monocotyredons

- The seed has only one cotyledon.
- Sundles of vascular tissues are scattered inside the stem.
- Flowers with trimerous whorts or their multiples.
- Leaves are narrow and parallel viend.
- They have fibrous roots.
- Exampres: wheat onlor and palm.

Dicatyledons

- The seed has two cotyledons,
- Bundles of vascular issues are arranged niarring
- Flowers are either tatramerous or pentamerous
- Leaves are of pinnate or palmate ventuon.
- They have tap roots.
- · Examples, peas, Beans and cotton

(5) Kingdom Animalia

They are pulticly ration eukaryonic organisms. They have the aprint, of moving and an sporting from a place it another they have the abrilly or responding a pully the external stimulum the surrounding environment. Their majority reproduce sexually

This kingdom will be studied in detail in chapter 3.

Unit Four

Chapter 3



Scientists crassity kingdom Anima ia into nine phyla

depending upon the degree of the body complexity.

Some phyla are without vertebral column and called

invertebrates, while others have a vertebra column

By the end of this chapter, you should be able to:

- Intentify the characteristic funtums of the major amorate physic.
- Lake examples of living organisms belonging to antesits.
- Classify some living apparisms or light of he modern classification
- Fayon a possible bond possentic than maintening of pupilingly.
- Appreciate the grandeur of Allah in creation of the various living organisms

ŧ

Phylum: Porifera (Sponges)

inside their bodies and called vertebrates.

the following link in EkB clustrates the charachteristics of sponges





Figure 24. The sponge

Sponges are classified as animals although they are immobile, because they are multicelta ar heterotophic, have no celwalls, and comprise few speciallized cells.



Phylam: Cnidaria

- They are aquatic animals the most are marine, and live individually or in colonies.
- They have no head, and the mouth is surrounced by appendages and extensions called tentacles.
- Body cells are arranged in two tissue layers, the external one contains childocytes (stringing cells)

key terms

- chi lgi
- 1000000
- Fig. b (m) (b)
- Negrosphys
- Attrighted
- Advental
- A 15 15 41
- Ecleradormara
- Ckradata

for defence and capturing of preys. I lentactes.

There are a pienty of these cells on

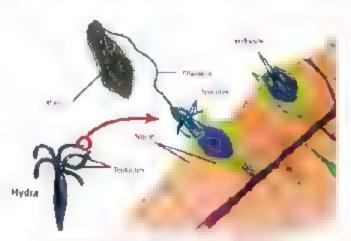


Figure 125e: Using of childocytes in capturing the parys

Example of Chidana, hydra aurena and sea anemone.



Figure (26): thydra



Dipure 127% Aurelia



Figure (24), Sea in eccurio

For more information about coral reety search at the special ized referred stes

Phylum: Platybelminthes (Flat worms)

gene 36. Mustrates a group of flat worms. Observe these worms, and intertheir common features.

Why are these worms called flat worms?



Figure (29) Olfarent sixes of let synthes

Fat wich siare charaterized by the following characters

- . The bodies of these worms are flatened and have a head
- Their bodies are composed of 3 layers triploblastic (and bilaterally symmetrical)
- The majority are free flying
- The majority are hermaphrodites
- Example of flatworms: planana, bliharzia and tape worms (Fig.2 ii)



Phylum: Nematoda (Round worms)

Round worms are characterized by the iol owing characters

- The body is cylindrical, tapers at its two ends and unsegmented. Their sizes are ranging from the microscopic to what may reach 1 meter.
- Their bodies consists of 3 layers and 6 laterally symmetrical
- They have alimentary canal with two openings, the mouth and arius
- The sexes are separate (unisexual).



Figure (30): Assorb

 They live in all environments, some are free-living in water or mud and others parasitize humans, animals and plants.

Examples: Ascaris of gare 30) and Haria worms.

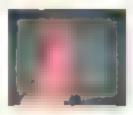


For more knowledge about this topic you can refer to the Egyptian Knowledge Bank (EKB) through the opposite link.



Enrichment information

Elephantinuis: This disease in caused by a nematode worm called flarae exists in the tropical regions of Asia continent. These worms live inside human blood and yroph vessels. This disease is transmitted by the biting insects, mainly mosquitoes, in cases of heavy intections, the worms may accome so ourserous that obstruct the flow of fluids through lymph vessels, causing swelling of the infected body parts as shown in the opposite figure.





Phylinii Armada Ring er segmentet worms).

Earth worms which are inside barrows in the soil it represent for aeriation and in crease soil fertilpity common examples.

of segmented worms. This group of worms are characterized by the following characteristics.

- The majority are free-living in the sea, fresh water. or the moist muddy soils. Few of these worms are externa parasites.
- The body is divided into rings (or segments), and many of them have chaetae (spine-like) buried in the skin and help them to move.
- Some of them are unisexual and the few are hermaphrodites

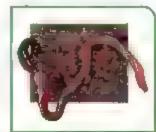


Fig we 3th High voem



Paylum: Arthropoda



Go Further

For more knowledge about this topic ? you can refer to the Egyptian Knowledge § Bank (EKB) through the opposite link



Search and expand The worm litestrated in the

figure is one of annexels (ring worms, caller the leerh Use the internet or reference. books to search the importance ()! these worms



This phylum is characterized by the following characteristics.

- The body is bitaterally symmetrical and divided into a number of segments carry many pairs of appendages. Each appendage consists of many jointed pieces.
- The segmented body is divided into many regions covered by an exoskeleton.

This phylum comprises four classes:





Figure (22): Examples of crustnesses

Class: Crustacea

The body consists of two regions (cephalothorax and abdomen) and covered will a chimous cuttod. They have many dishted appendages adapted in different arms a perform various to at ans. The eyes are compround They area the by means of gills. Examples: prawn, crabs and lobster (fig. 32)

Class: Arucha da

The body consists of two regions (cepha othorax and abdomen). They have tour pairs of walking lesgs and breathe by Tracheores or lung books. Their eyes are simple They are unisexual Examples: Spiders and scorpions (fig. 10).





Scorpion

Figure 133): Examples of atachetes

f lass Insects

The body is divided into head, thorax and abok men. They have one pair of antennae, a pair of compound eyes, 3 pairs of warking egs and 3 pairs of wings which may be absent as it he majority of antispecies or reduced into one pair as inhouse fives. They breather by Tracheoles. Examples: thes, mosquitoes, cockroaches, antis bees, moths and locusts (fig. 14).

Enrichment information

Simple eyes consist of one ens, whereas compound eyes cansists of a arge number of separted enses which work to form a solic image to the object factions protography and erect an or the algorithe number area and shape of such lenses differ with respect to the species.









Hote fly

Lacust

Dragonth

Figure 346: Boampes of insects

• Class, Myriapoda

The body is distinguished into a head and a trunk composed of several segments. They have many walking legs they respire by tracheae. Example: **Scolopendra** (log.35).



Figure (35): Scoropeddia

Phylum: Mollusca

This phylom is chracter zed by the following chalacter spess.

- Their major ty live in salt water, some in fresh water and a few up land.
- The body is a soft mass, unsegmented and has a mascular part used in accomption called the foot.
- They have a calcareous shell which may be external or internal labsent or reduced.
- The head is present and well developed (carries sense argains) and may be absent in some of them.
- The majority of moduses have an organ similar to the tongue called the radulal used in feeding
- Most of them are un social, and the rew are hermaphrodites.
- Examples : shads, byster and octopus. (Fig. 36).



Snail



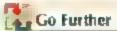
Pigure 36): Esamples of molluses



Octopia



Phylum: Echinodermata



For more knowledge about this topic of you can refer to the Egyptian Knowledge of Bank (EKB) through the opposite link.



This physum is characterized by the following chracteristics.

- The body is unsegmented, and has a hard endoskelet in Some have spines and calcareous plates in body wal.
- They have sucker ike structures called tube-feet.
- The body may be rounded cylindrical or stars raped. Some have arms.
- They move by tabe feet, spines or arms.
- They are unisexual reproduce asesso y by regeneration and sex tally by gametes
- They have no anter or or posterior end. The bodies of ech hoderns majority
 has two surfaces. The surface in which the most his located is called the oral
 surface and the opposite sufface in called the abora, surface.
- Examples : sea star, sea urchin and seacucumber. (Fig. 17)



Figure (37): Examples of echinoderms



Phylum Chordata

What is the largest phylum in living organisims?



To answer this question use the apposite Lok in EKB

Sub-phylam Vertebrata

Notochord first appears in vertebrates in the embryonic stage. It becomes gradually replaced by the vertebral column as the embryo develops. Vertebral culumn surrounds and projects the spinal cord. Vertebrates also have an endoskeleton It consists of the venebral column, sku a girdles and limbs, in addition to presence of a hear formed of many chambers and the broad flows inside broad vessels in a closed circulation to feed all body organs with oxygen and nutrients.

* Vertebrates are classified into several classes.





Go Further

For more knowledge about this topk ? you can refer to the Egyptian Knowledge & Bank EKB) through the opposite ank.



Chess, Agnataa

- They are jawless, shes with a circle armouth similar to the funite, and provided. with many horny teeth
- They have a thin, long and eet. like body with no paired tins. Their skeleton. is carb lagenous.
- They are parasites. They stick by their mouth into the big fishes. They attach themselves by the teeth and snap the flesh of these tishes by their rough tongue which is a milar to the rasp

Example: Lamprey (hg. 48)



- They are marine fishes. The endoskeleton is cartilogenous.
- The mouth lies on the ventral surface and provided with several rows of teeth that help them in predation.

Do you know?

Vertebrates and thermal equilibrium

Buily temperature of some verteb ites such as birds and manimab does not change more with the change of environment temperature. Therefore, they are called endothermies or warmblooded animals. They use the energy or food to keep their body temperature constant. Fishes, amphibians and reptiles are belonging to the variable temperature animals, where they can't regulate their body temperature which change according to the change in the surrounding environment. They denve their temperature from this environment. Therefore, they are called ectotherms or cold blooties amounts



Figure (38): Lampre)

- They have paired fins and the body is covered with certain scales similar to the teeth.
- They have no air bladder for floating. Their gill sits are not covered by an operculum. The sexes are separate and tertilization is internal.

Examples: Shark and Ray fish (fig. 35).



Figure (39) Ecomples of canalogenous Othes

Class; Ostelchthyes

- These fishes live in salt or tresh water.
- Its endoskeleton is bony. Their mouth is terminal. The body has paired and media fins. There is an air biadder inside the body he plog in swimming and floating.
- The body is covered with bony scales. Their gill sits are covered with an operculum.
- The sexes are separate and fertilization is external.

Examples Boltl and Bourt (6g. 40)



Figure 40% Examples of hoty fishes.



Bolti

Class: Amphibia



Go Further

For more knowledge about this topic of you can refer to the Egypt an Knowledge & Bank (EKB) through the opposite link.



- They are cold blooded an mais.
- . They have two pairs of pentadacty limbs. The

Enrichment

frogs croaking, if you we near agricultural fields, perhaps you have heard the croaking of trogs. This woice comes from mate frogs during mating season for attracting the females for mating. The mate can produce this voice because it has a special structure called voice sac which is absent a top ales.

body is covered with smooth slimy skin.

The sexes are separate. Fertilization is external. They lay their eggs in water and
the embryonic stages, live in water and breathe by gills with elaculis are spent
on land and breathe atmospheric air by lungs and skin.

Examples: frog and salamonder dig 4.





Figure (4) s Kinds orang Malan

- Class: Reptilia



For more knowledge about this topic you can refer to the Egyptian Knowledge Bank (EKB) through the opposite link.



- These animals are cold blooded.
- The body consists of four regions: head, neck, trunk and tail. They have four
 weak pentadactyl imbs. Each finger ends with a horny diaw. The limbs may be
 absent, so they move by creeping.
- The skin is dry and is covered with thick domy scales, which may be supported by homy plates.
- They breathe atmospheric air by lungs.
- Sexes are separate. Fertilization is (memal and they lay eggs with calcareous
 or skiny shell.

Examples: Lizards, chameleon, gecko, tortoise, shake, and crocodile. (fig. 42,



Chan Sent



4 and



Cranslin

to Class Aves



For more knowledge about this topic |
vc. an reject at he Egyphian Knowledge |
Kank (EEB) through the opposite line



- These animals are warm blooded.
- The bodies are covered with feathers. They have four imbs, the anterior ones are modified into wings for flying. Each one of hind limbs has four digits provided with horny claws. The bind limbs help in movement on land, climbing, swimming, diving or predation.
- Bor estate hollow and light. The stemont is broad nor attach nent of the strong thoracic muscles which move the wings during flying.
- They breatne by means of lungs. Their bodies contain air sacs aut as stores for additional amounts of air during flying.
- The sexes are separate. Firtilization is internal, and they lay eggs and incubate them.
 Examples. Pigeons, hens, ducks, bawks, eagles, sparrows and ostrich, (fig. 41).







Figure Main Offerent types of lands

- Class: Maringha

Go Further

For more knowledge about this topic you can refer to the Egyptian Knowledge Bank (EKB) through the opposite link.



- These animals are warm bronded
- The body is distinguished into head, neck, thorax and abdomen. The skin is covered with hair.
- hey have rour pentadactyl limbs provided with nails, claves, hooves in pads.
- hey are characterized by presence of a samular teeth (inclinors, can nessure molars).
 The sexes are separate. Fertification is internal. The majority of them are viviparous.
 The female has mammary grands which secrete milk to suckle her youngs.
- They breathe by means of lungs.

* Class Mamolia is class fied into three sub-classes

Prototheria	Meratheria	Lutheria	
incubate them. The eggs hatch youngs suck e milk secreted by manimary glands on the automen of the mother They	Those and as gen both pland he young benefice the mother has to keep a special notice to the distinct of her abdunce. He coung feets by sicking mix rominipales made.	All these amount one illacental mammais. How give both to make involvement volumes form in the second form.	
Examples Duck-billed Platypus and Spiny and leater.	Fample Kangaroo	adhula in local chary sit re- esti mas flux are hearby, by fumbor	





Figure (44): Dack billed Platyous

Figure (45): Kangaroo

Sub-class Eutherlain classified into many oders, from which

Order	Characteristics	Examples	
Edentata	 Some are without teeth while the others lost their front teeth only. They have strong, curved claws. 	Armad Ilu and Sioth	Armadillo
Insectivora	 They feed on insects and their front teeth extend outwards like pincers for capturing of the prey. 	Hedgehog	As the op-
Carnivora	 They have large pointed carrines. The premolars are sharp, whereas the molars are broad and grinding. They have strong, sharp curved claws. 	Lion, Tiger, Wolf, Fox, Dug, Cat and Seal	Tiger

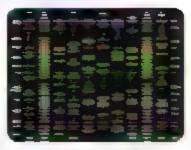
Per ssodactyla	 They are herbivore animals. They are odd-toed (1-3). Each toe has a homy hoof. Their teeth are big-sized and adapted to good rood. 	Horse, Donkey, Zebra and Rhyroceros	a cobra
Artiodactyla	 These an mals are herbivores. They are even - toed. Each toe is coaled with a horny hoof. 	Sheep, Goats, Giraife, Deer and Camers	Curth
Cetacea	 They are huge aquatic animals live in seas and oceans The forelimbs are modified to become paddle—like for swimming and the bind imbs are absent. They breathe atmosphric air by lungs. Sexes are separate. They give birth and suckle their youngs. Tail fin is horizonta. 	Whale and Desphin	Astrals
Rodent a	 They have one pair of Ladson in each faw They have sharp chiseleshaped noisors. The tail is ong and each are small. 	Rat, Gerbo. Mouse & Squirer	K
1 agranorpha	 The tail is short and ears are tong. They have two pair of incisors in the upper Jaw and two pairs in the lower jaw. 	Rabbat	Rahhri
Ch roptra	 The forel mbs are modified into wings where the fingers (2nd 5th are elongated and the skin extends between them from the body. They become active mainly during the night. 	8at	N.

Proboscida	 They have a long muscular probost is. The two upper focisors grow to form what is known as the 	Elephants	M.
	two elephant canines.		Eluptaonts
Pnoráles	 They are the most higher manimals. They have two pairs of the pentadactyl limbs. The thumb finger lies away from the rest of fingers. The brain is large in size and nervous system is highly developed in the higher forms. 	Monkey, Lemur, Contla, Chimpanzee, and Man	Star (BL

Science, technology and society

Modern technologies in classification of living organisms

The studies of first scient sts in class fication of IN Ingiorganisms depended upon the morphological comparisons to determine the similarities and differences between various organisms. After that (hundreds years ago), screntists turned to classify organisms on the basis of determining the degrees of retevance and relatedness (evolutionary) relationships) among them through their researches. in the field of comparative anatomy for determining. the anatomical similarities in natural structures as



skeletal structures and glands, as well as the emoryonic development, too

Nowarlays, scientists knowledge at new toundations that can be relied upon to determine the degrees of relevance and relatedness among living organisms. were increased through the development of microscopic screening techniques by invention of election microscope. The recent scientific studies for studying the similar has habupen the gane and organisms depended on the scientific researches. on the naula claded DINA existing in the novieus through DINA sequencing technique. In this technique, the arrangement and sequence of nucleuhdes of DNA double strand are identified. Scientists found that the greater the sequence in the order of nuclea ides in UNA strand, his organisms were more relevant and related

Frontiers in biology

A more recent use for sponges and cridarians, especially jellyfish, is in the bromedical and pharmaceutical industries. Researchers have found promising new antibiotic and anticancer compounds in the small percentage of sponge species they have studied. Researchers are also investigating possible. medical uses for the paratyzing possible medical uses for the paralyzing toxins that some jellyfish. use to capture prey. This branch of biotechnology is guite new, but very exciting. Research will probably result in the development of new medicines



NEW TERMS

- Kingdom: the highest level in taxonomic hierarchy of living organisms.
- Phylium: A taxonomic level represents the biggest group of the kingdom and composed of classes.
- Species: A group of individuals which have similar morphological characterates
 and mate to produce fertile offspring similar to them.
- Dichotomous key: A series of closer poons proceed in parts and good the user to adentify the species of an unknown living organism.
- Monera: Unicellular inokarvot deliganisms, the ricell wall is devoid of cellulose or pect in and they also are devoid of several membranous organelies.
- Protista. Eukaryotic inco-complicated structured organisms, some have cellwalls and plastids, their majority are unicellular and few are multicellular.
- Bryophyta: Terres nall plants, contain no vascular tissues, and greatly need wetness for growth and reproduction.
- Ferne: They are structurally simple plants containing vascular tissues, live in shady wet areas and reproduce by spores.
- Portifera (sponges) They are situaturally simple aquatic animals with asymmetric bodies containing many pores and canals.
- Coldaria. Aquatic admais their bodies are racially symmetrical and provided with singing cells.
- Arthropoda. A group of animals, their birdies are divided into a number of segments carry several pairs of appendages, each one consists of several jointed precess.
- Mollusca: A group of animals characterized by a soft body covered with a
 dermal tissue dailed mantle that secretes a protective categoous external or
 internal shell.
- Echinodermata: A group of an mais characterized by a ngid endoweleton, and many of them have spines, prickles and calcareous plates in their body wall.
- Chordata: A group of an mais, their embryos are characterized by presence of a skeletal structure at their dorsal region called the notochord.

Summary of living organisms classification

Kingdom	Phylum	Subphy unt	Class	Sub-class	Order	Examples
	As hadouter					
	401174 ma					Mostor and several types of
		1	Func indika			Ampeta
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	resembly					harans
	Руморниц					Smaragellates
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Fung	op army of	1			†	Pennethum Yeat
	3 11 141 11	-			+ -	Alechionin
	Manufiphyto .					Paksyahanta
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ingdom	Pledan	Suliphylum	Class	Subplisfam	Order	Examples
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			Copha ipaca			невория Весия
			Squeside			Title Instant
	clanystornats		timpetra			Se arbin
			tokelk roidna			Sea sycumber
			sporth a	4.		(Graphe)
			Charafter to			Shork Ray
			deminibera			Bolt Bourt
			Al ye bia			Fug Selectunder
			Retalls.			Chambelean - Snak - Lazard - Unorreitle Tente
			Vie s			Ostrick Rigeon Lawk
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				Stration		Kingaioo
	not list.	And And			Edereate	Action of the States
					Insectivora	Sudgehag
					Carrette	Day Tiger-Wolf-Dog-Cr Sed
					Periesdactyla	Home-Dankey Zehra Shinoceral
			No min	a Milierja	Альясаюра	Sheer-Goal Olraffis- Deer Camels
					Colores	Wate-Colphia
					Mademilia	Rat Gorbo-Mouse-Sout
					Ligomorphia	Pladatsil
					Chimpotess	Eat
					Pro tao spidale	Dophani
					Primares	Manhoy-Garify Chitty/(sun-Main

Unit four

Activites and Excersises

Chapter 1

Principles of living organisms classification





Designing a taxonomic key

Safety precautions



Activity goal

Catalying there is a more and disappeng a disholuminus key stall can be search to deatify the leaves.

Acquired skills

Observing, organizing, Classifying, Designing, Recording and analyzing data Concluding,

Materials needed

6 - 10 different types of leaves, usuales, esagestrong hans, lean.

Procedure: ___

Gather a group of leaves that are different in shape and size from your environment.



Irlentify the characteristics you will use for classifying the leaves.

uplour: Shape:

Design a dichotomous Key you will use to classify the leaves

- Revise your key as needed, to make it easier to use.

 Are there other ways in which you could have grouped the specimens? Describe these alternate ways.
- Compare the key you have designed with that designed by your colleagues in the group

Modern classification of living organisms

Practical activity	Shapes and characteristics of bacteria
Activity goal Framility for a serious to a serious descriptions Acquired skiles Westing to a fram Framining, Olorsong to entry the story of the story of the serious to the story of the st	Cooperate with your colleagues in the group for examining states, demunstrating observations exchanging the views and comparing the results with that of other groups their participate in expressing at opin on through the group discussion which carried out under the supervision and guidance of your teacher. Procedure: Examine using the increascope each of the three numbered stades (1 - 3) that your teacher has given you. Make a rough sketch of each bacterium, and classify it as either epoch, bacilir or spiri a: Observation and scientific drawing been deach of the 3 stides?
Classifying [1] What is the criterium	State 2 Sex 3 State 2 Sex 3 Used on classifying these three types of bacteria?
	in slide (1): 4

- The type of bacteria in slide (2):
- The type of bacteria in slide (3):
- What are the summarities in the specimens you examined?

Practical activity

Examining protists in pond water

cooperate with your colleagues in the group for carrying out the procedure of this activity and discussing, comparing and interpreting the results

Safety precautions



Activity goal

arter og a sample til potek veiler, teler i gradide i sam det gæret og herman of og omistion til est kindsken.

Acquired skills

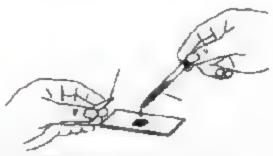
Working its a tourn, observing, recording was unalyzing thats, interpreting Conducting.

Materials needed

Fund water glass sticles, caused instrucompound light the obscope, glass many lakey as After that a group discussion will be conducted under supervision and guidance of your teacher to interpret the results to come into a conclusion

Procedure:

- Bring a small tresh sample of pond water
- Place a drop of pond water on the side, and cover it with a covership
- Use the microscope to examine pond water under low power objective ens.



A ligaritative here is a drop of posel water standed in the slide. These covering it want a coverage a coverage to the remarkable.

Drawing and data recording

Control Islant	ganisms which you observe in pond water ucle from this activity?
President activity	Examining Ferns
Activity goal containing a had of feet plant and stanting of a characteristics. Acquired skills Observing, Scientific eleving, becoming, and analyzing data.	Procedure: Your teacher will give you green leaves of a fern to examine Lise the hand lens to examine the upper and surfaces of the fern leaf Record your observation. Sketch the fern leaf and illustrate the struct appear on its lower surface.





Examining a flowering plant

Safety precautions



Activity goal

Cachin by Albertert, meth Blad On fowe ing planty comiate of and destifying whether it is different in he approximate destroy and Bosses. min with a topocount plant or a c

Acquired skills

Working in a team, Observing, Scientific Statema, by ording a visity sing date, Concluding.

Materials rended

triviated tear itself theseins plant, and hard love.

Cooperate with your coileagues in the group for carrying out this activity, demonstrating observations, exchanging the views and comparing the results with that of other groups. Then participate in expressing an opinion through the group discussions carried out under the supervision and guidance of your leacher.

Expectation: Knowing the main parts of the flowering plant

procedure: -

- [3] Observe the Hant of Goor group and drawnt, cabel the names of plant parts as you can.
- 2 Use the hand iens to observe the plant parts in more detail. Record your observations about the appearance of those parts and their structure



Life plans



Main plans

- in Observation and scientific drawing
- in Observe different parts of the flower og plant. What are these parts?
- Sketch the plant, and label the names of its parts.

- im Ana रणहातेका
- flompare the rest, is or your group with that of other groups in the for owing able.

ingon ing to	cross Related	
Roots		
reaves.	1)	
No. of floral whoris:		

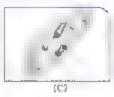
- Are all flowering plats share the same parts?
- Conclusion.
- What do you conclude from this activity?

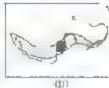
Assessment activity

The following figures I ustrate some protests:



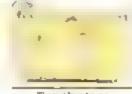






- Specify the phylum and class that each organism belongs to.
 - (A) and shit tilliand to be assential as in
- (C)
- (D)
- ldentify the mean of locomotion for each organism.
- When two pieces of bread, one of them is dry and the other id wet, were leaved in a warm place for 3 - 4 days, the results were as the following to





The day based poor

The was break poor o

When examining the developing mould on the wet bread piece using microscope. the following organisms were observed.

- What is the cause of change occurred to the wet piece of bread?
- What is the source of change occurred to the well piece of breadt
- Why did not a change occur to the dry prece of bread as the wet piece?
- Specify the phylum that these developing organisms on the wet piece of bread are belonging to



Kingdom Animalia





Examining earth worms

Safety precautions



Acquired skills

Observing, Describing, Artifyzing, Conducting.

Activity goal

Identifying the characteristic and ages of earth actume

Materials needed

Earth women in a container of camp so as investment of the white poperat, forcepacy, magnifying less, and people reliefs.

Procedure: -

- place the worms over newspapers.
- Determine the length of a worm using the ruler
- Let the worms move.





- Catch a worm and pass your fingers on the ventral surface from back to front.
- . | Count the segments in earth worm body
- Observation and data analyzing
- Describe the external shape of earth worm
- Tescribe the movement of earth worm and explain how is external structures allow movement.
- What is your felling when you passed your fingers on the ventral surface of the world?
- Do you hear a sound when the worm moves on the paper?
- · Conclasion
- or not ide. What are the characteristic teatures of a metics, ting worms, such as earth worms?

Practical actively



Comparing reptiles with amphibians

Safety precautions



Activity goal

Companing the permission of a republication and amphibition one

Acquired Skills

Observing Recording and analyzing date, Concluding

Materials needed

Preserved specimens of littards and solds

Cooperate with your group colleagues in carrying out this activity, demonstrating observations, exchanging the views and comparing the results with that of a other groups. Then, participate in expressing an opinion through the group discussion which carried out under the supervision and guidance of your teacher.

identify which of the structural characteristics can be used for distinguishing and comparing between reptiles and amphibians.





Procedure:

- Observe both he lizard and toad without touching. Doscribe what to do you see.
- Observation and data recording:
- Observe both the izard and load. Describe the most important inciphological structures for both.
- Toad's characteristics
- Lizard's chalacteristics.
- an Analyzing data.
- [1] What is the more obvious difference between the morphological structures of both the toad and lizard? Mention the other differences you observed
- How does the skin or both animals seem?

an Concids and

What are the external structures that can be used for clishinguishing between reptiles and amphib, ans?





Animals classification

Safely precautions



Activity goal

Classifying different tends of animals according to the obstinguishing characters or each

Acquired skills

Worlding in a main. Observing:

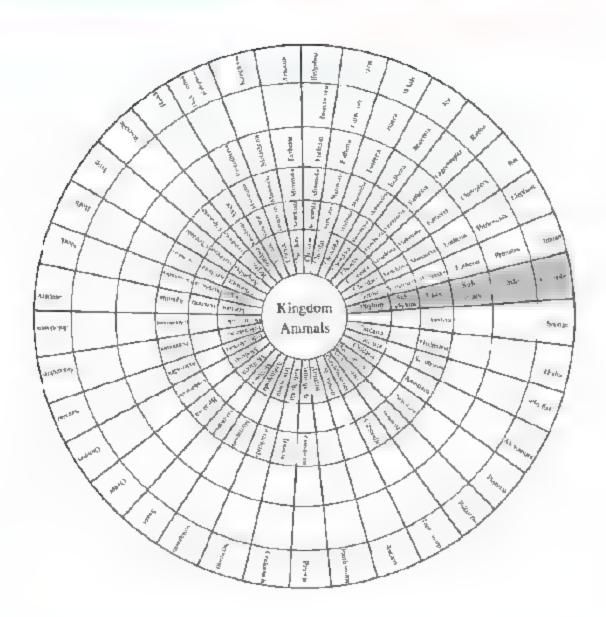
Materials needed

Compass, cardsoard, and scissos.

Share a group of your coheagues in carrying out this activity. Debate and exchange views in every attempt before making sure the correct answer shown in the mode.

Procedure: -

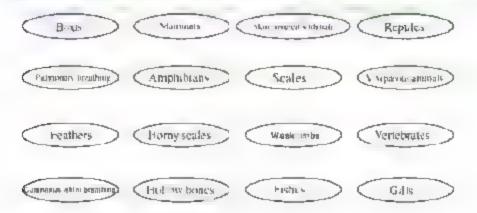
- ____ Use the compass and sussors to design a disc of cardboard of a radius 8 cm
- Place this disclover the circle shown in this activity so the 2 centers of both circles are coincide together.
- Cut a section of the disc, so the shaded part of the circle appears.
- Start the activity by choosing one or trainal examples, then determine the order class and phyllim that this example belongs to
- Jis case voor group about the answer voor reached, then makes are the correctness of the answer by moving the disc, so the cut section of disc faces this example.





Designing a concept map

Design a concept map using the following terms



Fourth unit excercises

First question: W	rite t	he scientific	term	for each of t	he foll	lowing statems	ents
The highest I	axon	omic level	irs taxo	onomic hiera	irchy i	of living organ	ernain (
2 A series of ch	varari	periotice media	News III	ewire that he	de the	sacre to leberth	6: 20
unknown livin			Heo III.	pans that he	th me	(y an
A type of hact	-		to surv	ive in harsh e	nviron	ments. ()
A type of fung	i proc	duces spores	inside.	club - shaped	struct	runes. ()
The plants tha						(3
The plants that						s. (3
The aquatic							cells.
						()
A type of w	10/11/15	that has a	cyline	frical body	and to	apered at its	ends,
						(3
Terrestrial plan others are flat.		e in damp so	oils , re	produce by s	pores,	some are erec	t and
Second questio		hoose the a	TOPPEC	Lanswer:		,	,
From the plant							
A. Malze (corn)	B.	Pea	C.	Pinus	p.	wheat	
From the exam	ples	of annelids (ring wo	orans);			
A. Liverfluk	B.	Ascaris	C.	Arachnids	D.	Earth worm	
Prawn is before	nging	to class.					
A. Insecta	ß.	Crustacea	C.	Arachnida	D.	Myriapoda	
Octopus belor	ngs to	phylum:					
A. Echinodermata	₿.	Mollusca	C.	Chidaria		Sponges	
From the exan	nples	of echinoder	TTIS:				
A. Sea urchin	B.	tellylish	C	\$nails	Ð.	Prawn	
5ponge anima	l is b	elonging to p	hylum				
A. Cindaria	B.	Ponfera	C.	Mollusca	Ð.	Arthropoda	
From the exan	ples	of insects:					
A. Hany been	B.	Crab	C.	Sand worm	Ð.	Scorpion	

- [Yeast belongs to kingdom:
- A. Plantae
- ft Animalia
- C. Fungi
- D. Monera

- From the warm blooded animals:
- A. Fishes
- B. Amphibians
- C. Mammals
- D. Reptiles

Third question: Give reasons for each of the following:

- Mule is not considered a species
- Bacteria are classified as monerans.
- Ascaris worm is a hematoda while earth worm is an annelld.
- Palm plant is classified as a monocotyledon.
- Despite the bat ability to fly, it is classified as a mammal, not a bird.
- [6] Kangaroo is classified as a metatherian animal.

Fourth question: Compare between each pair of the following:

- Monocotyledons and dicotyledons
- Birds and reptiles
- Insects and arachnids

Fifth question: Classify the following organisms into their phyla and classes

[Amoelsa

- Mushroom
- Trypanosoma
- Toad

[3] jellyfish

- Hawk
- Honey bees
- Snake

Miscellaneous questions:

- What are the coidocytes (stinging cells)? What is the phylum that comprises animals comaining these cells?
- What are the distinguishing characteristics of birds bones which help them to fly?
- what is the mammalian animal that keeps its young in a sac at the bottom of its abdomen? Why?
- Mention the conditions that followed when writing the scientific names of living organisms.


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رقبه الكتاب:

مقاس الكتاب:

منسع المتان:

منسع المالاف:

منسط الفالف:

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